ELECTRICAL TIMES

THURSDAY, JAN. 5, 1950

VOL. 117 NO. 2832

EST. 1891

6D

Presenting the New

MAZDA-MELLOW

Fluorescent Lamp

BTH are proud to announce an entirely new Mazda fluorescent lamp — the latest step in their never-ending research to give you better light. The wonderful new MAZDA-MELLOW lamp costs no more than ordinary fluorescent lamps and is at present available in 5 ft. 80 watt size. It creates an atmosphere of warm friendliness, adds new charm to beauty, new luxury to furnishings, new delight to food and provides the perfect finishing touch to any scheme of interior decoration.

For further details please write to the BTH Lighting Advisory Service, Bridle Path, Watford, Tel: Watford 7701/8. London Showroom, Crown House, Aldwych, W.C.2. Tel: Temple Bar 8040. Ext. 242.

MAZDA

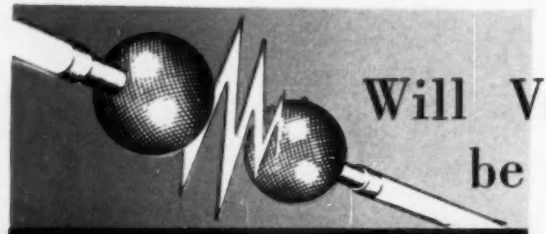
the outshining light

MAZDA LAMPS AND LIGHTING EQUIPMENT

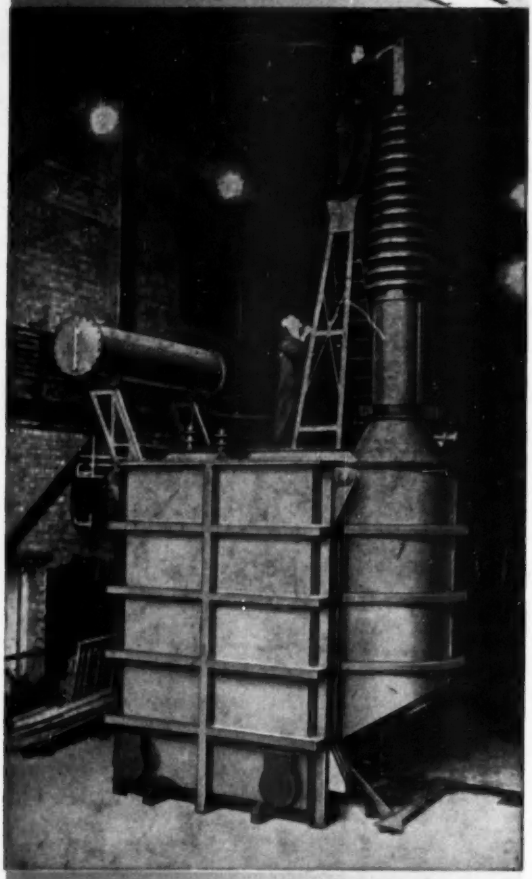
Made in England by B·T·H *Leaders in Lighting*

THE BRITISH THOMSON-HOUSTON COMPANY LTD.

4252



Will Voltages be higher still?



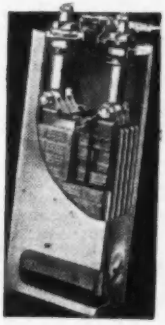
Whatever the future trend, B.E.T. designers and craftsmen are prepared for it. This 264 kV experimental unit built by the B.E.T. is proof that work is already well advanced on the solution of problems of higher voltages. Your transformer problem is in the right hands with the B.E.T.—one of the largest specialist transformer Companies in Great Britain.

The
British Electric Transformer
Company Limited
in association with **CROMPTON PARKINSON LIMITED**
CROMPTON HOUSE, ALDWYCH, LONDON, W.C.2

N2

FOR INSTANT RECOVERY

Even after the heaviest discharge, a Nife battery recovers its voltage almost instantaneously. This valuable feature of the alkaline battery is probably the biggest single argument in favour of Nife for switchgear operation. But not the only argument — Nife batteries are also practically indestructible by virtue of their steel construction and steel-preserving electrolyte. So they cost next to nothing to maintain — and they also take up very little space. It's not surprising that some of the main grid power stations in the land rely entirely on Nife for switchgear operation.



CUT YOUR COSTS WITH NIFE STEEL BATTERIES

(N.B. Nife batteries are not yet available for private cars or domestic radio).

NIFE BATTERIES · REDDITCH · WORCESTERSHIRE

A

Not only a high grade tubing at a competitive price but a great time-saver in conduit installation — "K" Aluminium Electrical Conduit Tubing. Easy to bend, to thread and to set. Quick to cut. Lighter to handle. Will not rust, meaning longer life for tubing and cable. Besides being a good thermal and electrical conductor it is non-magnetic and of attractive appearance.

Available in all the usual conduit sizes, in aluminium or—for extra strength—in aluminium alloy. Supplied with plain ends or screwed with couplings. Let us quote for your requirements.

Aluminium CONDUIT TUBING

E. & E. KAYE LTD.
PONDERS END · ENFIELD · MIDDLESEX

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THE *Ladybird* MOWER

- IT'S *ELECTRIC*
- WORKS OFF HOUSE MAINS AC/DC
- WEIGHS ONLY 15 lbs.

Its complete simplicity of design and operation make it as easy to use as a vacuum cleaner. So easy, even a child can use it!

RETAILS AT 19 GNS. (*Inc. P.T.*)

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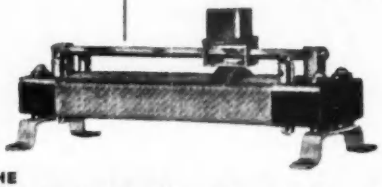
List No. 80 containing data and prices of our standard sliding Resistances is both useful and interesting. May we send you a copy?

- We shall be glad to co-operate in their solution and to suggest suitable Apparatus. CRESSALL Resistances incorporate the soundest electrical and mechanical principles in design—yet prices are competitive.



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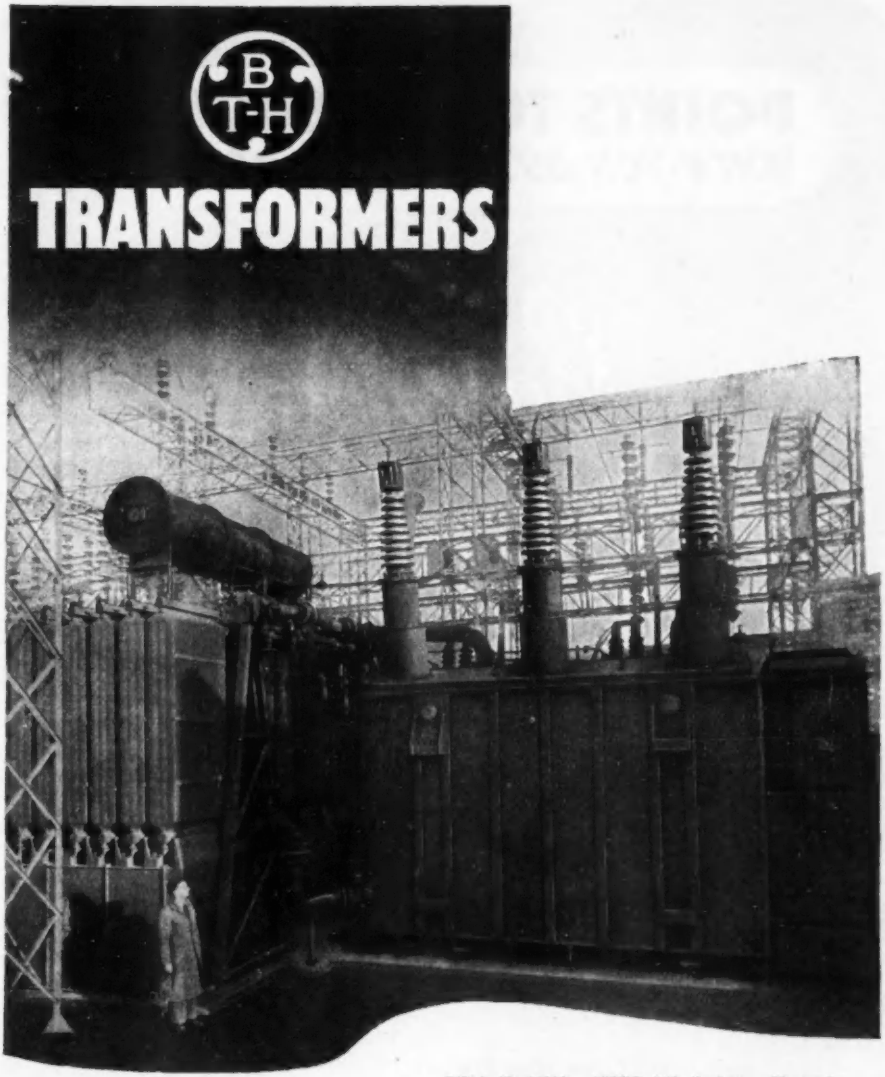

BTH 60 MVA., 132/33 kV. 3-phase, 50 cycle Transformer at the Hams Hall Sub-Station of the British Electricity Authority, Midlands Division

BRITISH THOMSON-HOUSTON

THE BRITISH THOMSON-HOUSTON COMPANY LIMITED • RUGBY • ENGLAND

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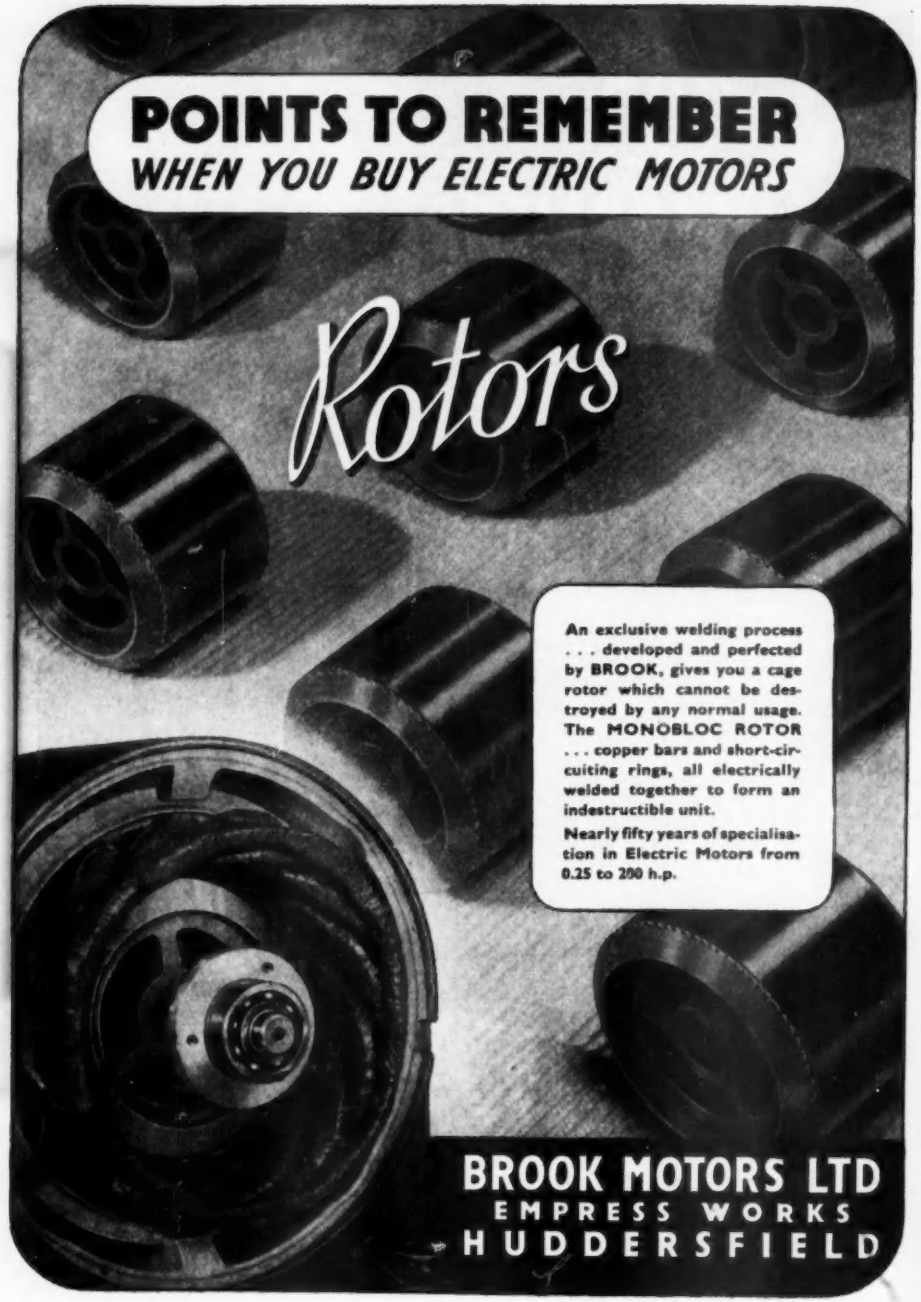
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An exclusive welding process . . . developed and perfected by BROOK, gives you a cage rotor which cannot be destroyed by any normal usage. The MONOBLOC ROTOR . . . copper bars and short-circuiting rings, all electrically welded together to form an indestructible unit.
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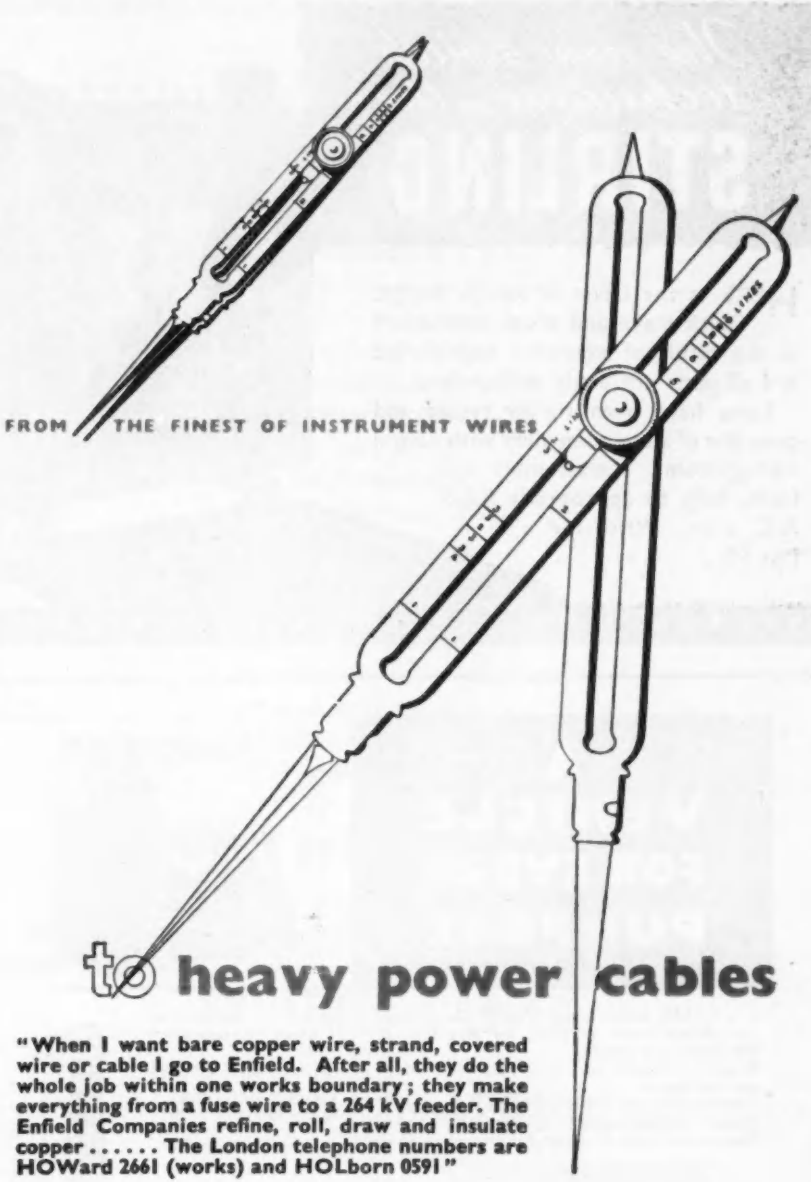


FROM THE FINEST OF INSTRUMENT WIRES

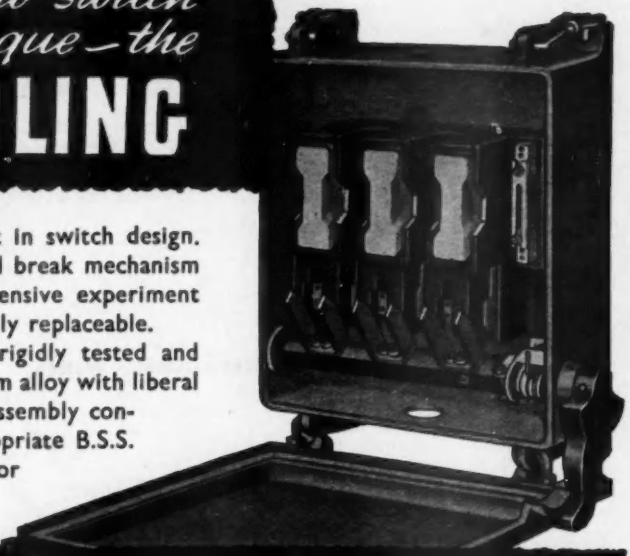
to heavy power cables

"When I want bare copper wire, strand, covered wire or cable I go to Enfield. After all, they do the whole job within one works boundary; they make everything from a fuse wire to a 264 kV feeder. The Enfield Companies refine, roll, draw and insulate copper . . . . . The London telephone numbers are HOWard 2661 (works) and HOLborn 0591"

ENFIELD CABLES LIMITED · BRIMSDOWN · MIDDLESEX

The new switch technique—the

STIRLING



HERE is the latest in switch design. Quick make and break mechanism is the result of extensive experiment and all parts are easily replaceable.

Fuses have been rigidly tested and cases are of aluminium alloy with liberal wiring room. The assembly conforms fully to appropriate B.S.S. A.C. only. Write for List ST1.

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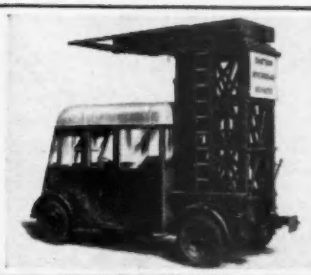
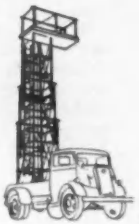


. . . no idle boast when EAGLE is specified . . . yet when we need to specialise—Tower Wagons, for instance—there is every consideration for important details.
Power hydraulic elevating gear with safety device, is simple, efficient and fool-proof.
Coachbuilt Cabs and workshops built to specification.
Special insulated mountings for working platform if specified.
Towers and cabs designed for any make of chassis.



EAGLE ENGINEERING CO: LIMITED

WARWICK ENGLAND

Telephone: Warwick 126, 127 and 128
Telegrams: "Eagle, Warwick."

3194A

A TURNING POINT IN CABLE ENGINEERING....

The introduction of J. & P. Seamless Aluminium Sheathed Cables—the first aluminium sheathed electric cables to be marketed in the world —is a major advance in cable engineering. The use of aluminium for cable sheathing, with its striking advantages of lightness and mechanical strength, has been delayed only by the difficulties of application .... difficulties which J. & P. research staff have led the world in overcoming.

SEAMLESS

ALUMINIUM

BRITISH PATENT Nos. 627815 & 627793

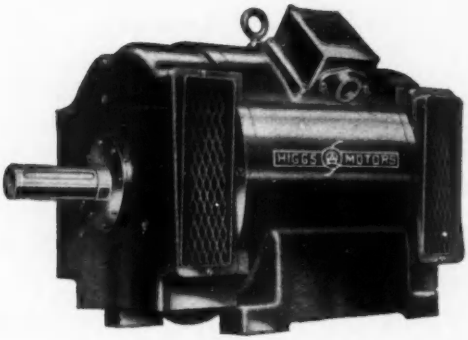
SHEATHED CABLES

JOHNSON & PHILLIPS LTD.

CHARLTON · LONDON · S.E.7

The mark that means that *"little more" in quality*

HIGGS MOTORS
TRADE MARK
CHAIRMAN WALTER F. HIGGS, M.I.E.E. LTD.
BIRMINGHAM 6 ENGLAND



APPROVED BY

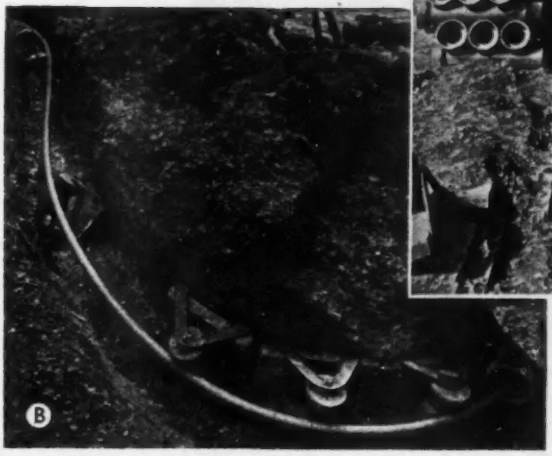
CANADIAN STANDARDS ASSOCIATION

AND

GUARANTEED FOR EVER

Belfast, Birmingham, Bristol, Dundee, Glasgow, London, Manchester, Newcastle, Peterborough, Sheffield, Wolverhampton

Aluminium Sheathed Cables



Manufactured and Installed by BICC

BICC aluminium sheathed power cables are in commercial operation using standard joints specially adapted for installation with aluminium sheathed cables.

The illustrations show lengths of 6·6 kV and 660v. cable being installed for the Southern Electricity Board.

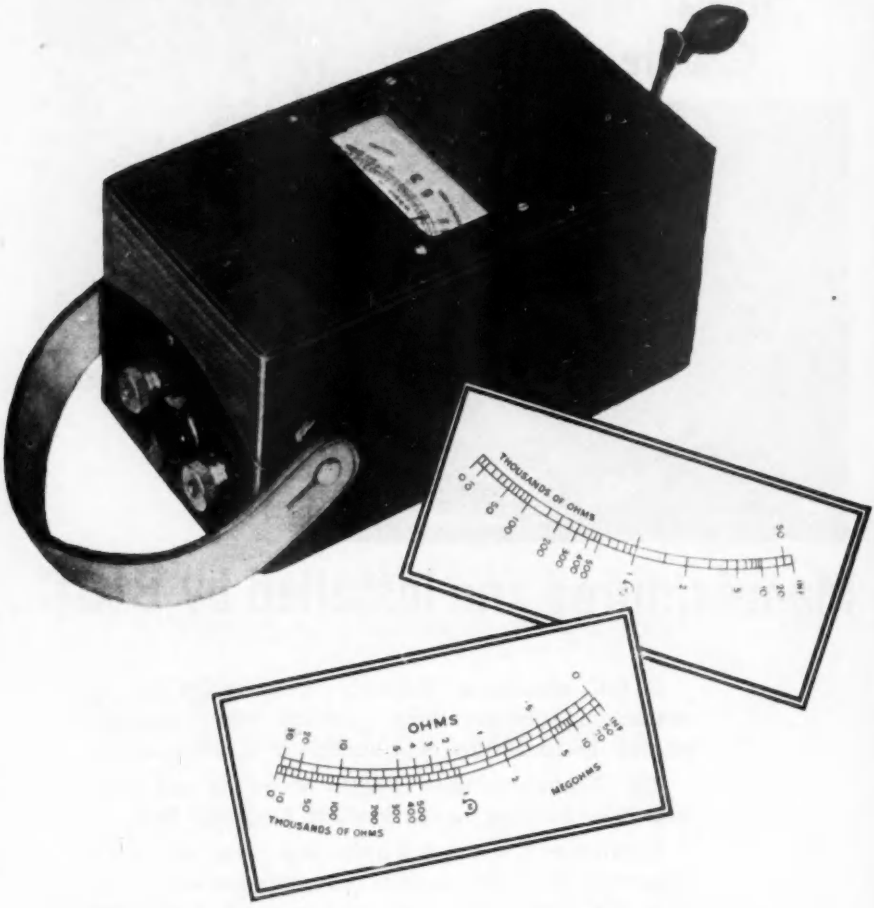
Illustration A shows a 6·6 kV cable being laid direct. Illustration B, showing a 660v. cable being drawn into a duct, demonstrates the severe arc through which the cable can be bent.

B.I. Callender's

ALUMINIUM SHEATHED CABLES

BRITISH INSULATED CALLENDER'S CABLES LIMITED
NORFOLK HOUSE, NORFOLK STREET, LONDON, W.C.2

THE "MAJOR" INSULATION TESTER

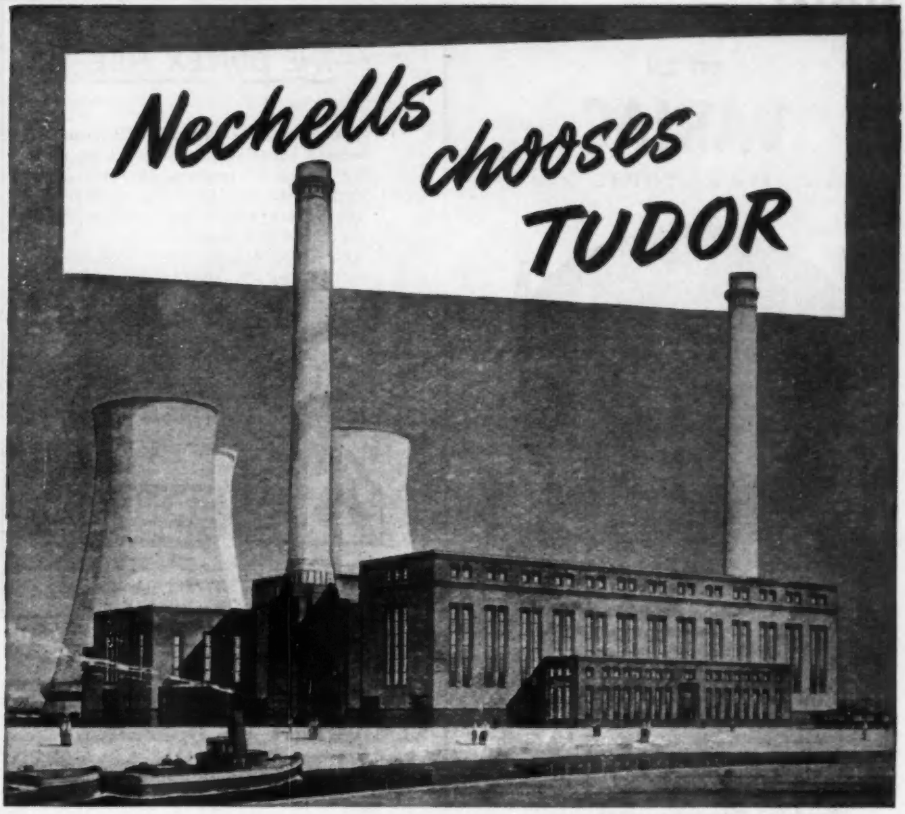


A RECORD instrument

Compact and light in weight, this latest addition to the Record family has a Constant Pressure generator of patent design. Ranges up to 500 volts 50 megohms with or without Continuity range of 0/30 ohms are available. Send for descriptive leaflet D/b.

THE RECORD ELECTRICAL CO. LTD., BROADHEATH, ALTRINCHAM, CHESHIRE

Phone: Altrincham 3221/3. Grams: "Infusion" Altrincham. London Office: 28 Victoria St., S.W.1 Phone: Abbey 5148



Nechells' new Power Station, Birmingham, like other great projects will rely on Tudor batteries. In this it follows the example of many others of Britain's new Power Stations where every item of equipment is rigidly selected on merit.

Please write for publications Nos. 66A 2 & 69D/2.

Tudor

BATTERIES

THE TUDOR ACCUMULATOR CO. LTD.,
50 GROSVENOR GARDENS, LONDON, S.W.1

Duplicate batteries will be installed each consisting of 115 cells in open glass boxes, having a capacity of 600 ampere-hours at the 10 hour discharge rate. The batteries will be used for supplying emergency lighting circuits, indicating, closing and tripping circuits of the main 11 Kv. switchgear and the 3.3 Kv. and 415 volts works supply switchgear.

T.71

NOW—Improved Deliveries on all VARIAC Transformers

A three-fold expansion in the rate of production of all Variac models from 50 watts to 7 kilowatts rating, coupled with improved deliveries of lamination steel, castings, mouldings and wires, now enables us to offer nearly all VARIAC Transformers "off the shelf." Most types can be furnished in parallel assemblies, or in 3-gang for 3-phase operation. Usual winding is 230 volt input (tap at 115 volt), 50 cycles, 1 phase; output is usually from 0-230 volt and/or 0-270 volt.

Send for Catalogue V549 today.

36 pages, profusely illustrated, containing complete data with dimensioned drawings of all Variac models.

Prices, circuits and special applications, etc., etc.

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THE DUPLEX FUSE

There are as many situations where ideal circuit protection is by means of rewireable fuses of established performance, as there are where the non-deteriorating cartridge fuse is essential.
The Duplex fuse, originated and introduced by us in 1937, gives optional choice of carrier with a base common to both, and therefore, the simplest form of change-over to either type whenever occasion demands

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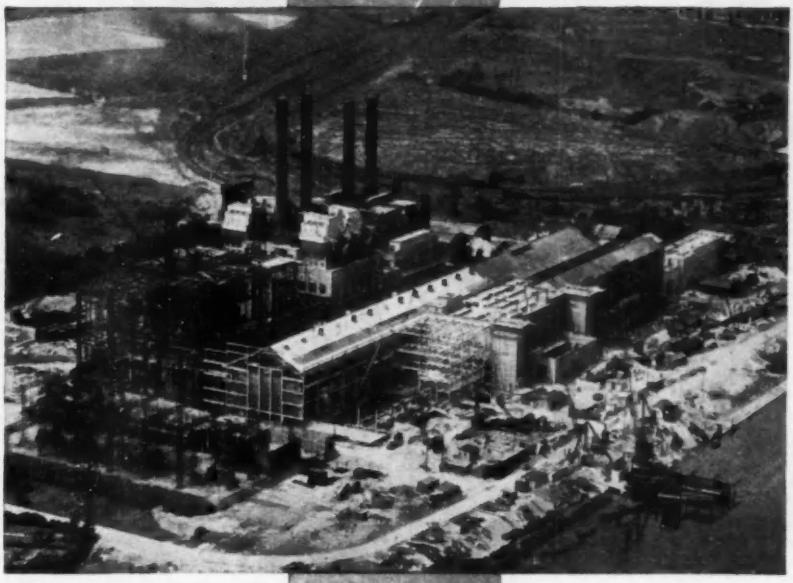
Parker Street, Kingsway, London, W.C.2.

POWER IN THE MAKING



S.G.1.

No. 4 — North Wilford

When 'A' Station was opened in 1925 its boilers were fired by USCO type 'A' Stokers and later boilers had type 'L' Stokers. Since 1934, however, extensions have been pulverised fuel fired using the unit system pioneered by ICL.

Station 'B' has four 'International' boilers each giving an output of 200,000 lbs. steam per hour at 625 p.s.i. and 800° F. Burners are mounted on the front wall of the furnace and are of the short flame turbulent flow type. A water-screen and refractory hopper are also incorporated.

A similar output and pressure per boiler, but at a temperature of 860° F, is provided in Station 'C' by tangentially fired 'International' radiant boilers having fully cooled furnaces and hoppers. In Station 'D' now under construction, the capacity of each 'International' boiler will be increased to 320,000 lbs. steam per hour.

USCO plate type air heaters are used throughout. On the later extensions they are in two stages with air attemperation for mill drying. Lopulco Roll Mills are used throughout for coal pulverising.

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Works : DERBY, ENGLAND ; PORT ELIZABETH, SOUTH AFRICA ; SYDNEY, AUSTRALIA

NEW

An important addition to the range of Royal "Ediswan" Fluorescent Lamps

THE ROYAL

"EDISWAN" Mellow LAMP

The beautiful lighting effects possible—warmer and more colourful—provide added scope in the field of fluorescent lighting.

Price is the same as the 5 ft. 80 watt "Daylight", "Natural" and "Warm White".

BY APPOINTMENT
SUPPLIERS OF ELECTRIC LAMPS
THE EDISON SWAN ELECTRIC CO. LTD.

EDISWAN

The first name in lamps

The last word in lighting

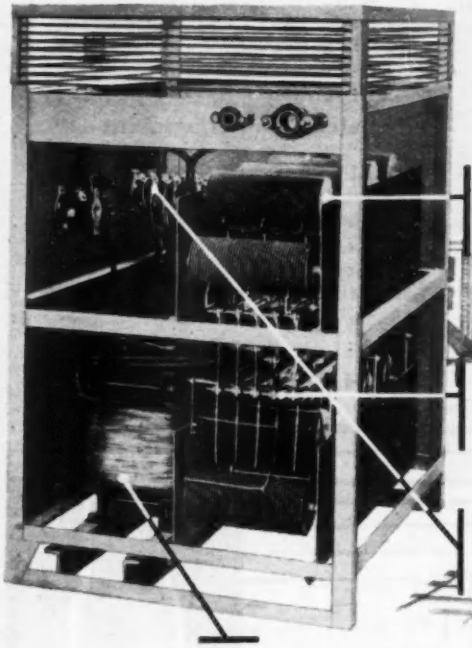
THE EDISON SWAN ELECTRIC CO. LTD., 155 CHARING CROSS RD., LONDON, W.C.2

Branches in all the principal towns

(L102)

CRYPTON

Selenium Rectifiers FOR MINING

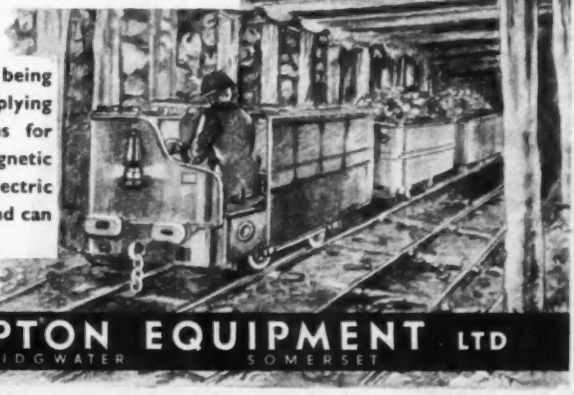


Metal Rectifier units are securely held in position to withstand vibration.

Full Wave bridge connected Selenium Metal Rectifiers.

Voltage Regulation by switch-tapping on the transformer primary.

Double wound, air cooled, liberally rated transformer.



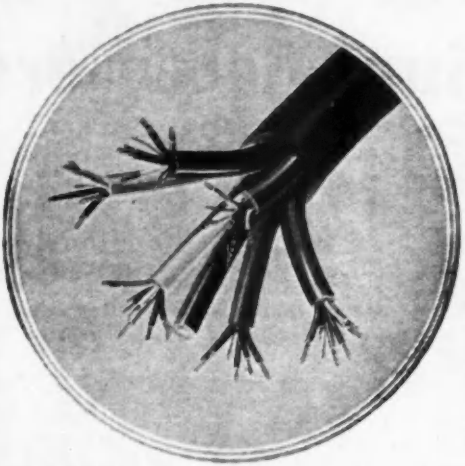
Crypton Selenium Rectifiers are being used in the Mining Industry for supplying Direct Current from A.C. mains for operating Signalling Apparatus, Magnetic Separators, D.C. electric motors, Electric Vehicles, Battery Chargers, etc., and can be oil immersed when desirable.

IPC ORGANIZATION

CRYPTON EQUIPMENT LTD
BRIDGWATER SOMERSET

Associated Companies: Lancashire Dynamo & Crypto Ltd. Crypto Ltd. Foster Transformers & Switchgear Ltd.

DURAWIRES AND DURACABLES



In addition to our wide range of P.V.C. insulated standard wires and cables, we specialise in the manufacture of cables for exceptional requirements.

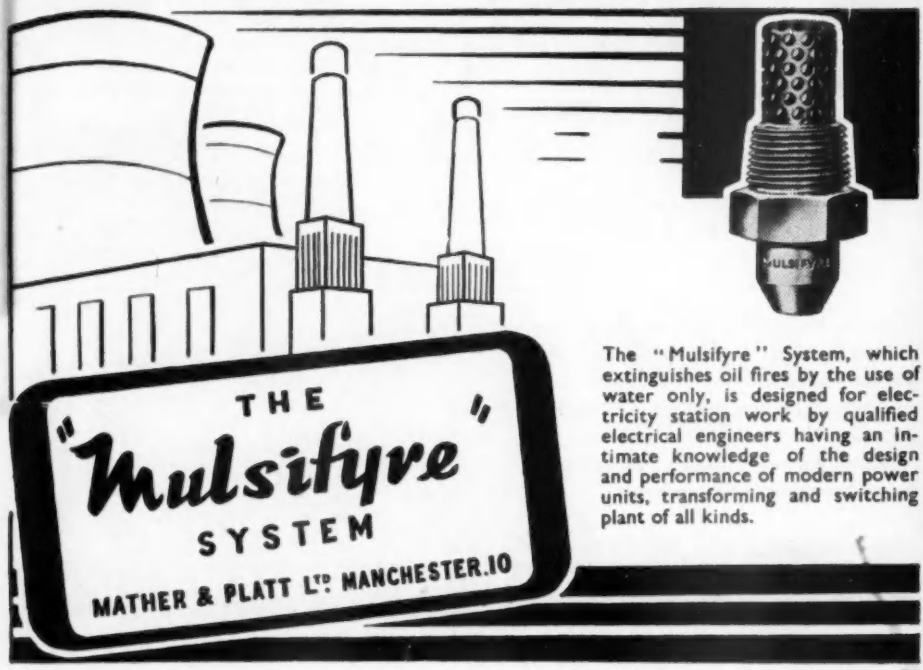
For the wiring of special electronic equipment

Special S.S.S. Duracable 36-core 9/·012, ·45 mm. radial thickness of insulation. Stranded in groups of six with dummy centres, each group separately sheathed in colours. The six groups stranded around a dummy centre and sheathed to 28 mm. o.d. Grade S101212.

Sole Manufacturers:

DURATUBE & WIRE LTD. . FELTHAM . MIDDLESEX

Telephone: Feltham 3453/6



The "Mulsifyre" System, which extinguishes oil fires by the use of water only, is designed for electricity station work by qualified electrical engineers having an intimate knowledge of the design and performance of modern power units, transforming and switching plant of all kinds.

Yes, somebody really should ! At the same time information could be passed on that whatever he needs in the way of Electrical equipment can be had from one central organisation. This way he can cut out fuss and worry and get the added advantage of a free pass to over 40 years' experience. He will also get the kind of intimate Service that irons out life's little wrinkles. Please, somebody tell him.

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BCE CO. LTD.

E.W.F. ELECTRICAL WHOLESALERS FEDERATION MEMBER

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(Established 1908)

160-40

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NEW **Osram**

'MELLOW'

FLUORESCENT LAMP

Introduced for situations where a really warm colour is required.

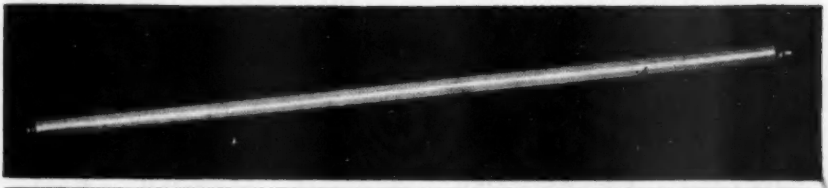
- This latest addition to the range of OSRAM Fluorescent lamps has been developed by the Research laboratories of the G.E.C.
- It is essentially a 'warm' light, being ideally suitable for all places where people are accustomed to gather. Human complexions are flattered and furnishings, fabrics and food stuffs look attactive.
- The OSRAM 'Mellow' Fluorescent lamp conforms in every respect apart from colour to the other 5 ft. lamps in the OSRAM range and may be used with existing fittings and gear.

Available in the 5 ft. 80 watt size only

List Price 15/6 each

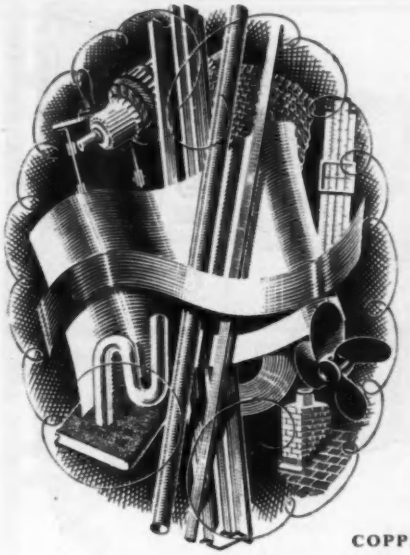
Purchase Tax 4/- extra

For use with instant start gear price 16/6 (purchase tax 4/3 extra).



THE GENERAL ELECTRIC CO. LTD., MAGNET HOUSE, KINGSWAY, LONDON, W.C.2

G 50



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The Association, which is a non-trading organisation, can tell you what copper and its alloys can or cannot do and how they can be used to the best advantage. Its services are available to all entirely free of charge or obligation. You have only to ask.

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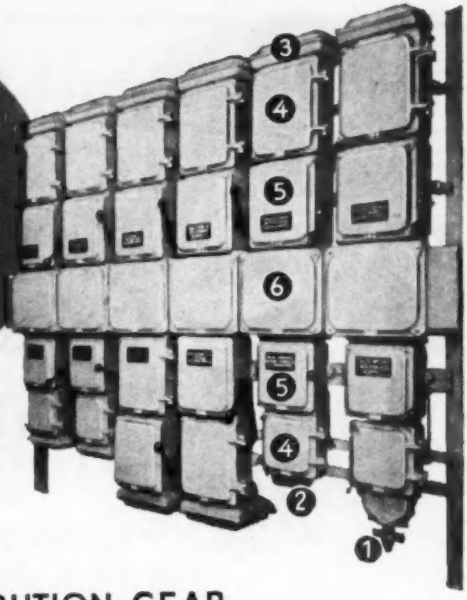
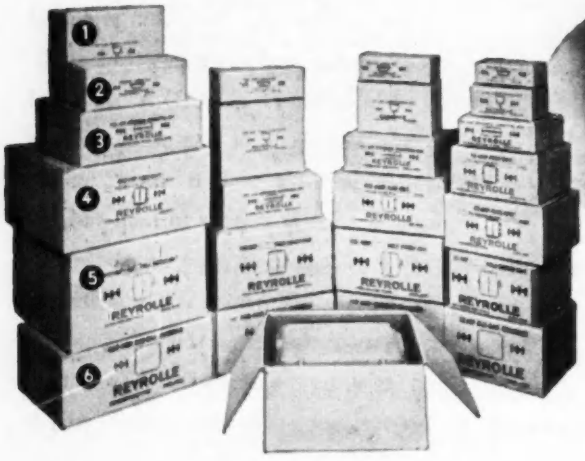


MEDIUM-VOLTAGE DISTRIBUTION-GEAR



Cartons used for stocks of units in Overseas offices

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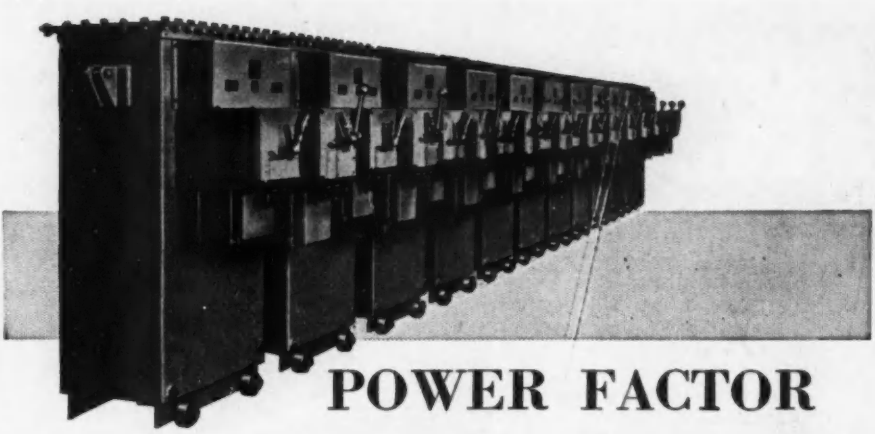

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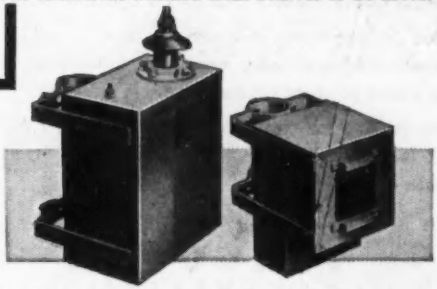

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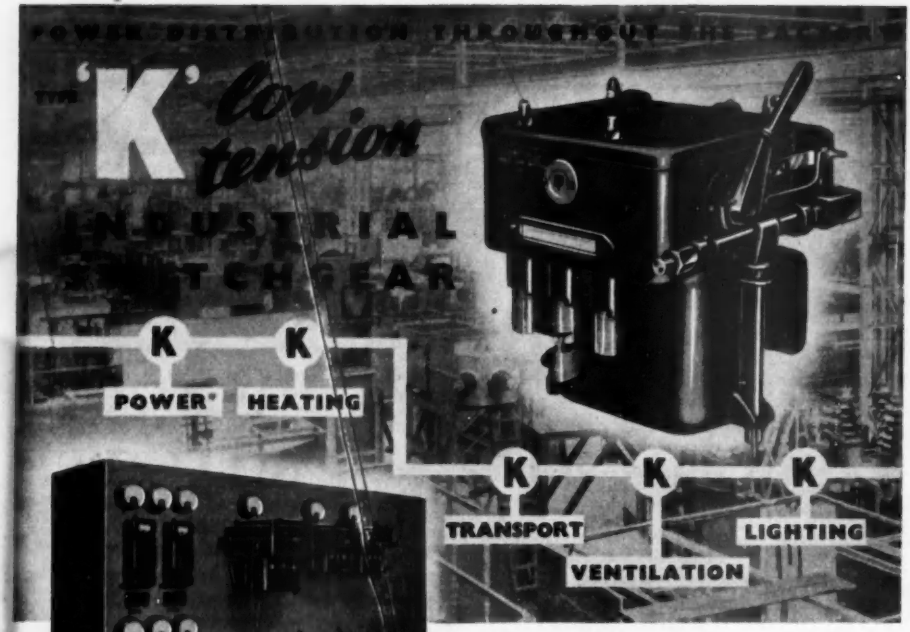

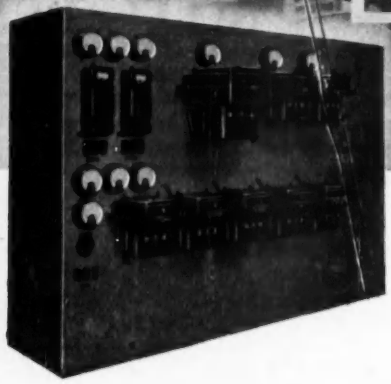

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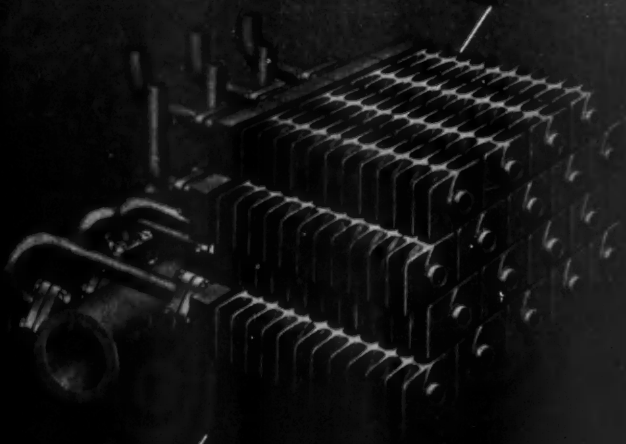

The illustration shows Green's Premier Diamond Economiser, Type 12, with steel tubes and cast-iron gilled sleeves.

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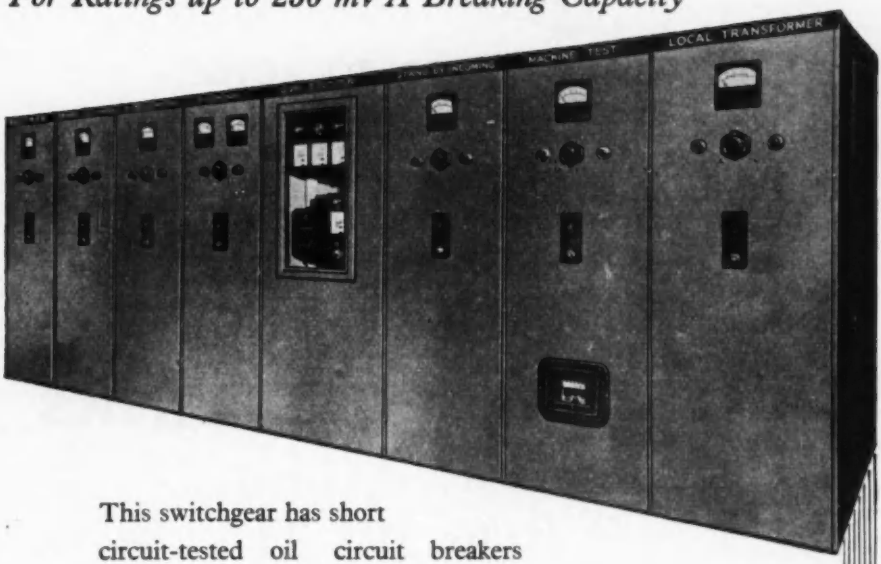

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ELECTRICAL TIMES

Vol. 117 No. 3035 THURSDAY, JANUARY 5, 1950

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PUBLISHED EVERY THURSDAY

IN THIS ISSUE . . . .

NORTH TEES POWER STATION (photograph) . . 3
OUR READERS' VIEWS 4
PRE-STRESSED CONCRETE POLES *by F. Walley, M.Sc., A.M.I.C.E.* 5
PRE-STRESSED POLES FROM THE USERS' POINT OF VIEW 7
MANUFACTURING PROGRESS IN 1949 . . . 9
BERLIN WEST RECONSTRUCTION 12
NEW LITERATURE 12
CABLE FAULT LOCALISATION *by G. W. Stubbings, B.Sc., A.M.I.E.E.* 13
BRITISH STANDARDS 14
PROBLEMS AND PRACTICE IN ENGINEERING . . 15
THE LIGHTING SERVICE BUREAU 17
OVERSEAS NEWS 18
PERSONALITIES IN THE INDUSTRY 20
NEW YEAR HONOURS 22
SPARE PLANT PLANNING 23
THREE CORE 66kV BARRIER JOINT 24
ULTRASONIC GENERATION 25
E.R.A. REPORTS 26
ULTRA-VIOLET LIGHT 27
THE BUYER'S COLUMN 28
THE WEEK IN NEWS 29
Electric Supply News 33
Company Activities 34
COMMERCIAL INFORMATION 35
CLASSIFIED ADVERTISEMENTS 37
INDEX TO ADVERTISERS 46

●**SUBSCRIPTION RATES.**—Home and abroad (except Canada) £1 15s. per annum (three years £4 10s.), Canada £1 12s. 10d. (three years £4 2s. 6d.). Pro rata for shorter periods. Subscriptions are payable in advance and may commence at any time. Overseas Subscriptions may be paid by bankers' draft, cheque or international money order.

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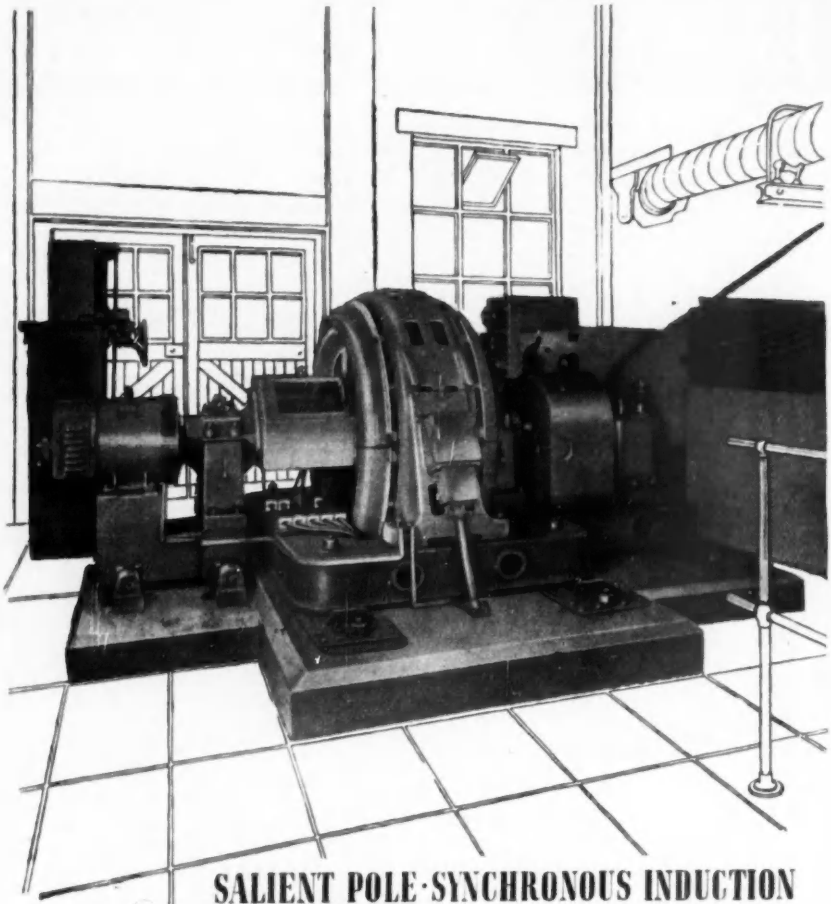
FIFTY-NINTH YEAR OF PUBLICATION



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Volume 117 No. 3035 ELECTRICAL TIMES Thursday, January 5, 1950

EDITORIAL

Fifty Years On

WE inevitably bow to the cold-hearted logic which tells us that 1900 was not the beginning of a new century but the finish of an old one. We must confess, however, that January, 1951, will arouse in us no emotion or give us that sense of a turning point with a new half-century ahead, which is instinctively associated with the January of this year. Few tears will be shed over the past 50 years, for the twentieth century, once hailed as the millennium, has brought not peace but war, not prosperity but strife and discord. Only in science and engineering has there been any major advance and the past 50 years has seen our own industry grow from adolescence to the full manhood of leading citizenship. There are few left, now, of the stalwarts who helped guide those critical steps of the early years, and who set the pattern of what has become one of the country's great industries. Few, also, who can recall those early days of experiment and improvisation, of fights and struggles against the obscurity of a new science. Much of this story lies forgotten in the past volumes on our shelves, and for that reason we are commencing the publication each week of extracts from the ELECTRICAL TIMES of 50 years ago. We hope they will bring pleasant recollections to the veterans and interest to all.

Electrical Share Index

FOLLOWING our policy of presenting key statistics in the readily assimilable form of graphs, we are introducing this week the first of a monthly series of curves presenting an index of electrical Ordinary share prices. It is hoped that the appeal of this index will not be confined to those interested solely in the Stock Exchange, for it has a greater significance in the yardstick it provides for gauging the general trading level and the relative commercial position of the industry. The index is calculated on a basis of the average prices in 1948 and includes nineteen firms carefully selected to represent all sections of the industry, excluding purely holding companies and those with appreciable interests outside the electrical field. In order to permit of comparisons of this index with the level of general industrial ordinary shares, we also reproduce, with permission, the *Financial Times* index of industrial security prices. This is adjusted to the same basic period as the electrical shares index, so that the two curves are strictly comparable. In this way general trends can readily be identified and isolated from those of purely electrical association.

Pre-stressed Concrete

CONCRETE poles, with their low maintenance costs, have been used by supply authorities for many years. The application of pre-stressing giving an increase in tensile strength is, however, a new development which has hitherto received little publicity. Elsewhere in this issue we publish an article dealing with the subject from the points of view of both the designer and the user. Flexible concrete appears to be a contradiction in terms, but thereis little doubt, from the tests described, that this desirable attribute has been achieved and the amount of bending and rough handling which this type of pole will withstand appears truly remarkable. On the question of comparative costs, the special techniques required in manufacture

inevitably increases the cost per pole. This, however, would decrease with increasing demand, and a point which should not be overlooked is that the increased pole strength will usually permit of longer spans, thus reducing the total number of poles for a given length of line. Other factors such as ability to withstand rough handling without damage, all play their part so that the actual cost per pole is not necessarily the deciding factor in a scheme.

Unfair Comparisons

MANY criticisms, some justified, others not, have appeared in the national Press regarding the administration and operation of the British Electricity Authority. A recent one, which fell into the second class, consisted of a comparison of the time taken for the reconstruction of the Berlin West power station and the time for the building of a British station. Six months was the time quoted for the German plant, as against four to five years in this country. The comparison is misleading and unjust. As our brief description on page 12 of the Berlin project shows, the site was already available and prepared as far as civil work was concerned; drawings and specifications of the sets and boiler plant were available in 1942, and in effect the only tasks left were manufacture and erection. That this occupied only eighteen months—the boiler erection taking only five and a half months—reflects great credit on the German engineers, but again the highest priority was given to the project, and a special labour force, at one time over 2,000 in number, recruited. Comparisons are always invidious, but in this case an injustice has been done to British engineers. Llynfi, it will be remembered, was on load 19 months after the first sod was cut.

Heat Pumps and the Festival

THE rumour that a heat pump is to be installed for warming the new Concert Hall for the Festival of Britain does not seem to have any definite foundation. Enquiries made have elicited the fact that the designs are going forward with ordinary boiler heating. It seems a great pity that the opportunity cannot be taken to install a heat pump, since the close proximity of the Thames would provide an ample supply of low-grade heat, and the operating costs, assuming a reasonable coefficient of performance, should be attractive. It is practically certain that there will be a heat pump installation at the 1951 Exhibition, for the purposes of public demonstration, but its application to the heating of a permanent building like the Concert Hall would kill two birds with one stone, and it would be interesting to know why the Ministry of Fuel and Power is not able to make any decision in this matter.

Meteor

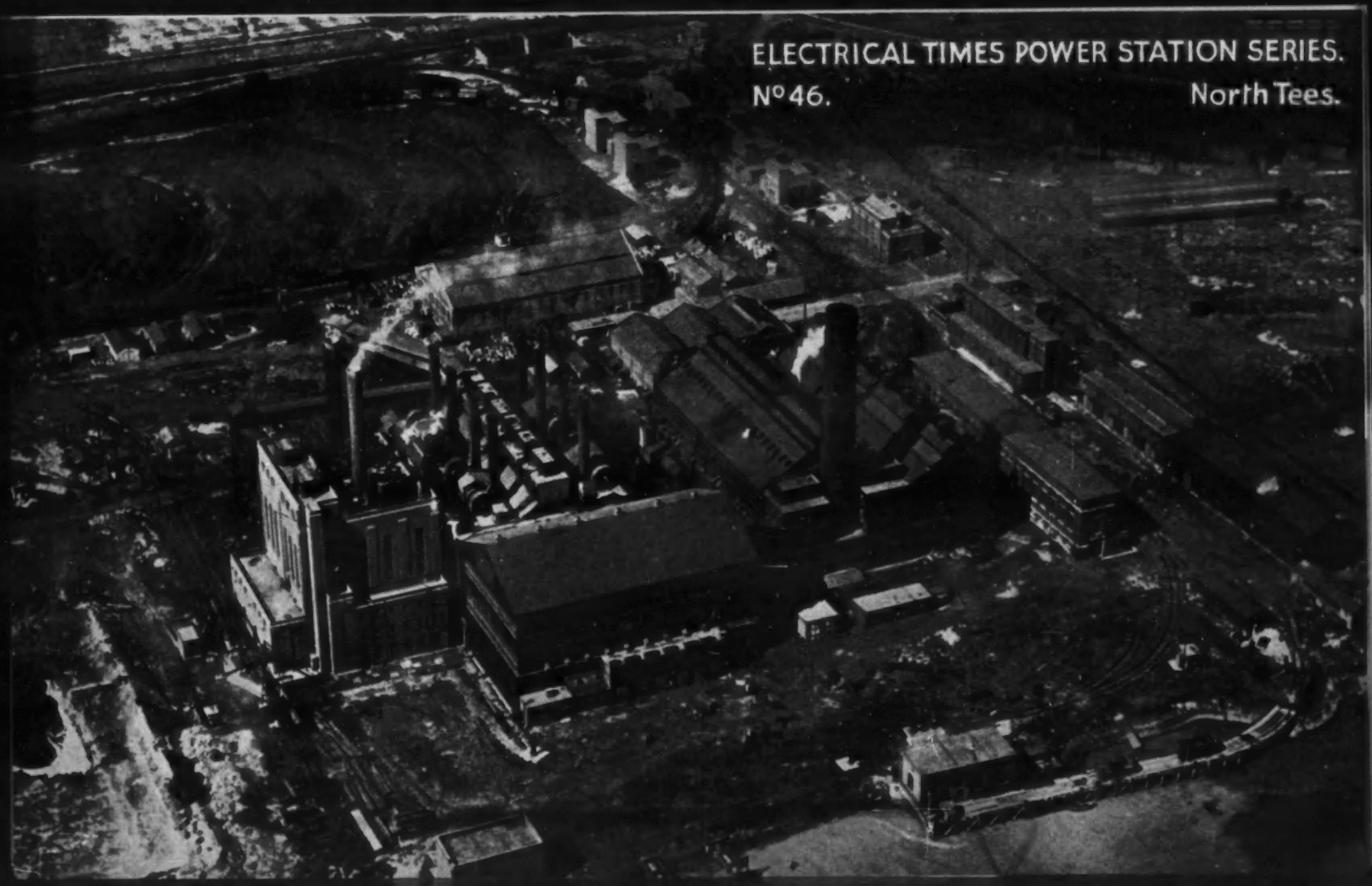
THIS WEEK'S PHOTO

WHEN North Tees power station was designed and construction work begun in the year 1917, it was the first station to adopt steam conditions of 450 lb/sq in. at 650° F. Other outstanding features at this station which distinguished it from the general design which had previously been adopted were the reheating of the steam between the h.p. and l.p. cylinders and the high generator terminal voltage, 11·5 kV, the previous highest being in the region of 6 kV. The station went into commission in 1921 with two 20 MW turbines by Metro-Vickers, each driving two 10 MW generators in tandem and ten 37·5k lb/hr Babcock and Wilcox boilers. In 1923 a further 20 MW set by Metro-Vickers was added. The 'B' station was completed in 1927 with two 25 MW turbo-alternators by C. A. Parsons and eight 85 k lb/hr Babcock and Wilcox boilers. The station was again extended in 1944 with the installation of two Babcock and Wilcox 180 k lb/hr p.f. boilers with centralised control and dampers, auxiliaries, etc., operated by the Lockheed system.

The station stands on the north bank of the River Tees, near Billingham, Co. Durham, fuel being supplied by rail from the adjacent Durham coalfield. The station busbar voltage of 11·5 kV is stepped up to 132 kV and connected direct to Norton switching station. There are also 66 kV ties through several intermediate substations to Dunston power station.

In the year ended March 31, 1949, North Tees supplied 505·53 million units at a load factor of 54·8% and maximum load of 106·8 MW. The overall thermal efficiency of the station for the year was 20·04%.

A new station, to be known as North Tees 'C' power station, is in course of construction on adjacent land. The plant authorised consists of four 60 MW Parsons turbo-generators and seven 360 k lb/hr Babcock and Wilcox boilers operating at 900 lb/sq in. and 900° F.


ELECTRICAL TIMES POWER STATION SERIES.
No 46.
North Tees.

OUR READERS' VIEWS

Regulations in Malaya

In your issue of November 10, Meteor under the heading "Efficiency—Or Else" gives your readers a most inaccurate and undesirable impression of the provisions of the new Federation of Malaya Electricity Ordinance.

1. Firstly he refers to "nationalisation of electricity supply" whereas what has occurred in Malaya is rather the reverse of nationalisation as the term is now understood in the United Kingdom. Under the provisions of the new Electricity Ordinance a Central Electricity Board has been established as "a body corporate" and in it have been vested only those electricity undertakings previously owned and operated by the Government. The Perak River Hydro Electric Power Company Limited and other existing Supply Companies continue to operate normally and there is no provision in the Ordinance for compulsory acquisition of such Companies prior to the expiration of their existing concession agreements. Such Companies are subject to the control of the Central Electricity Board only in so far as major extensions require the approval of the Board (in order to co-ordinate the overall development of electricity supply in the Federation) and in so far as the Board has power to prescribe electricity rates if it finds that existing rates are excessive.

2. Secondly, Meteor gives a quite incorrect quotation from Section 86 (2) of the Ordinance, which sets out the *maximum* penalties for a rash act or omission which *has caused* injury to a person or damage to property, and not as Meteor suggests *is likely to cause* injury or damage. Furthermore the penalties prescribed can only be imposed after the Chief Electrical Inspector, with the assistance of two assessors appointed by the Board, has held an enquiry into the accident in accordance with the provisions of Section 80 of the Ordinance. Upon completion of the enquiry the Chief Electrical Inspector, if he thinks that criminal proceedings lie against any person, must forward to the Public Prosecutor a complete copy of the evidence, findings, and report of the enquiry and the Public Prosecutor is the person who ultimately decides what further action is to be taken. It is felt that this procedure affords ample protection against any tendency towards high-handed or dictatorial action either by the Chief Inspector or by the Government, since the assessors appointed would normally be Engineers employed neither by the Central Electricity Board nor by Government.

3. The large scale use of electricity in Malaya only dates back a little more than twenty years, and the technical knowledge and experience of many operatives is still inferior to that usually obtaining in the United Kingdom. The machinery and procedure of Government is also different from the United Kingdom and it is only natural that a slightly different system of supervision and control should have evolved. The new Electricity Ordinance was considered by a select committee on which were Engineers who had spent many years working in Malaya, and they apparently saw no cause to criticise the clause which seems to strike terror into Meteor's heart.

4. In my view no qualified Engineer in Malaya has any fear of dictatorial action by the Central Electricity Board or the Government, and enjoys such freedom as he is accustomed to in the United Kingdom. I would be obliged if you would publish my views in order to correct the unfortunate impression which I feel Meteor has conveyed to your readers, most of whom have probably no first hand knowledge of the actual conditions existing here.

J. H. Sumner

Acting Chief Electrical Inspector,
Central Electricity Board,
Federation of Malaya.

Monotechnic Education

Does not B.Sc.(Eng.) Lond. in his letter published in your issue of December 29 rather confuse the humanities as a group of studies with humans, as mankind in general? Perhaps the apparent unconsciousness of his play on words is an indication of the benefits he might have derived from closer association with the gentler studies.

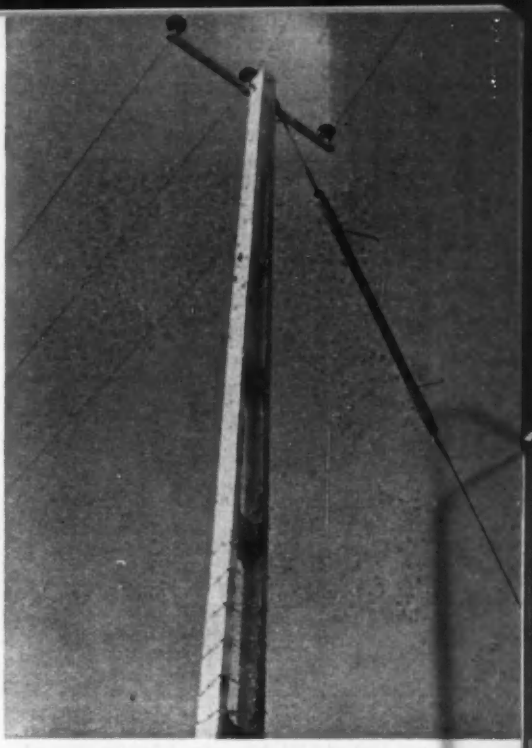
The humanities in their fullness are undoubtably a valuable study for the engineer in training, either directly or at second hand from fellow students in the arts faculty. From either activity a likely result is an amelioration of one of the endemic shortcomings of the engineer as a class—an inability to express himself clearly to those not engaged in his own speciality.

Another U.L. Engineer

January 5, 1950

PRE-STRESSED CONCRETE POLES

By F. WALLEY, M.Sc., A.M.I.C.E.,
Chief Development Engineers' Division,
Ministry of Works*



BECAUSE of the present timber shortage, finding a satisfactory substitute material for the construction of transmission poles has become a matter of some importance. For many years reinforced concrete has been used, but because of their weight poles made by this method are difficult to handle and due to the nature of the applied loading, need a large quantity of mild steel. When satisfactory methods of pre-stressing concrete were developed, the construction of transmission poles using this process became a practical possibility, and the disadvantage of excessive weight was avoided.

Principles of Pre-stressing

In pre-stressed concrete the whole section is made to resist the various forces applied. This is in contrast to reinforced concrete where it is always assumed that the concrete is incapable of resisting any tensile stresses which occur due to bending or other causes. The whole section is made to work by setting up in the concrete, before the application of any load, a compression equal or nearly equal to the tensile stresses developed at working load.

This may be done in two ways—by pre-tensioning or by post-tensioning. The former method is the one more commonly used; in this method high tensile steel wires of 100 ton/sq in. and over in ultimate strength are stretched by a hydraulic jack until they are stressed to about 70 ton/sq in. and then anchored between fixed abutments. While the wires are still in their stressed state moulds for the poles are assembled round them and the concrete is placed.

Since the concrete has to be of very good quality, a mix with a low water/cement ratio must be used and vibrators are required in order to compact it. The ends of the wires are released when the concrete has reached a compressive strength of 4-5,000 lb/sq in., which under normal curing using a rapid hardening Portland cement is in 4-5 days, but if heat and pressure are used, a matter of hours. The wires tend to return to their original length, but are prevented from doing so by the hardened concrete. The concrete thus comes under pressure, the overall compression being equal to the tension remaining in the steel wires. Several poles can be made simultaneously by this method by having the moulds in line and the abutments several hundred feet apart.

In the second method, the concrete pole is made with a longitudinal duct or ducts, through which cables are threaded when the concrete is hard and then stressed using the ends of the pole as the abutments. This method has been used on the Continent.

The statement that the compression is made to equal the anticipated tensile stress is not strictly true unless the section is designed only for working conditions. In the case of poles, the failing load is the important criterion in design, it being understood that there must be no overstrain at working load. If full economy is to be achieved, the failing load must be known in relation to the working load before the pole is designed. Here two opposing factors have to be reconciled. To achieve lightness and hence ease of handling and low transport charges, it is obviously desirable to use the highest stress possible in the concrete. A pole

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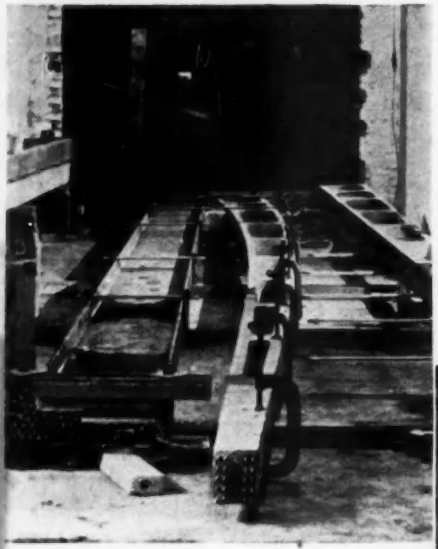


Fig. 1 (above). Costain pre-stressed pole with test load of 2,250 lb showing deflection obtained

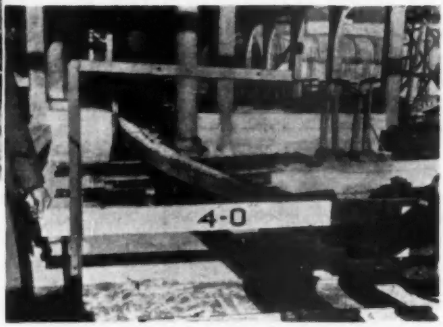


Fig. 2 (right). Concrete Utilities pole showing deflection of 4 ft obtained under test conditions

with uniform pre-stress, however, will always fail in compression; therefore the use of very high concrete stresses (more than 2,000 lb/sq in.) must result in a reduction of the failing load of the pole in relation to the compressive strength of the concrete. Experiments to determine the optimum stress are in progress.

Performance under Test

Over the past few years experiments have been carried out by the Ministry of Works to determine a suitable design for transmission line poles, and to show their suitability or otherwise for their purpose. A series of poles of different designs was made by the Costain Concrete Co., Ltd., and tested; a brief review of these tests, together with tests on telegraph poles, has been published elsewhere.* Fig. 1 shows one of these poles under test. The load was applied 28ft above "ground level" and in this case the pole sustained a load of 2,250 lb with a deflection of nearly 27 in., 95% of which was recovered when the load was removed. Fig. 2 shows a pre-stressed pole designed and under test by Concrete Utilities, Ltd., with a load of 1,300 lb applied with a lever arm of 23 ft. The deflection was 4 ft with a subsequent recovery of 94%. Such resilience is a feature of pre-stressed concrete members.

* "Conference on Pre-stressed Concrete." Proceedings of the conference held at the Institution of Civil Engineers, February, 1949.

Comparison with Normal R.C.

Fig. 3 gives an interesting comparison between the load of deflection curves of two similar poles, one a normal reinforced concrete pole and the other a pre-stressed pole using only one-third the weight of steel. This is based on information supplied by Concrete Utilities, Ltd. Cracks which occur when overloads are applied completely disappear when the load is removed since the concrete is automatically returned to its state of uniform compression.

The results of the tests carried out by the Ministry were considered satisfactory by the Eastern Electricity Board who asked for a line to be erected using pre-stressed concrete poles, and placed a contract with the Costain Concrete Co., Ltd., at Childerditch, Essex. These poles follow the general pattern of the experimental ones, but modifications have been introduced to facilitate production. The poles are designed for an ultimate load of 1,250 lb applied 2 ft from the top, with a working load of 500 lb and a transverse ultimate load of not less than 400 lb applied at the same point.

Poles up to 40 ft in length have been manufactured but the general run in lengths is up to 36 ft with a planting depth of 5 ft for the 28 ft and 30 ft lengths, 6 ft for the 32, 34 and 36 ft lengths; for lengths greater than this it is 7 ft.

The table on page 7 gives a comparison of the weights of pre-stressed concrete poles, and normal reinforced concrete poles and the quantities of steel used.

The pre-stressed concrete poles weigh considerably less than the reinforced concrete ones with consequent saving in materials. The

poles are made so that the standard fixtures of normal transmission line poles can be used.

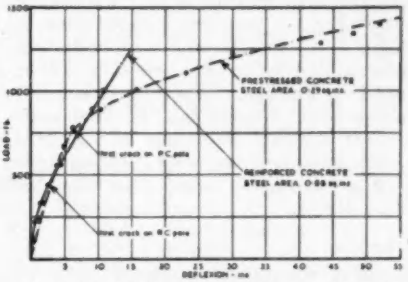


Fig. 3. Load Deflection Curve for medium class poles ultimate load 1250 lb, lever arm 23 ft

Similar experimental work has been carried out on pre-stressed concrete telegraph poles. These, however, have to be designed for equal loading in all directions; many types have been made and tested but the chief difficulty here is to arrive at a satisfactory production model.

MEDIUM CLASS POLE—1,250 lb ultimate load.

Type of pole	Length of pole (ft)	Overall weight (cwt)	Weight of steel (lb)
Pre-stressed concrete	30	9½	33*
	32	10	36*
	34	10½	45*
	36	11	50*
Reinforced concrete	29	15	125
	31	16½	135
	33	18½	145
	35	20	155
	37	21½	165

* 0·2 in. diam. h.t. steel wire, 100-110 tons/sq in. ultimate stress. A small amount of mild steel is also used.

A hollow circular pole is, of course, the ideal shape and there is no reason why pre-stressing should not be applied in the spinning process to make them. It would appear at the moment, however, that a cheaper process is to form the core in other ways.

PRE-STRESSED POLES FROM THE USERS' POINT OF VIEW

By courtesy of the Eastern Electricity Board (Essex Sub-Area)

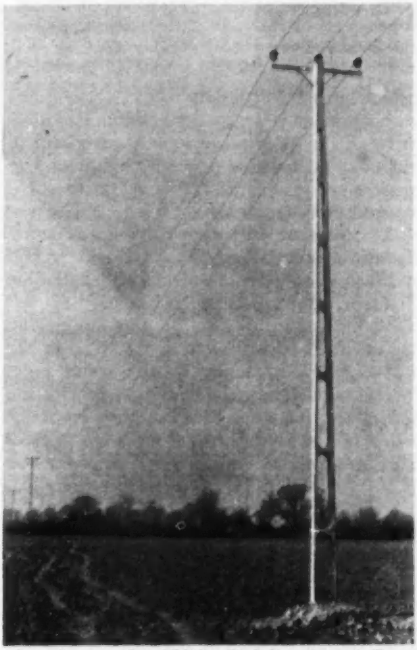
EARLY in 1949 the Essex Sub-Area of the Eastern Electricity Board planned a reinforcing of the 11 kV supply between Childerditch Hall and Codham Hall (near Brentwood) and this was carried out using pre-stressed concrete poles, the manufacture and testing of which have already been described.

As pre-stressed concrete distribution pole design is a new development, and as this line was the first of its kind to be erected, the project was basically experimental.

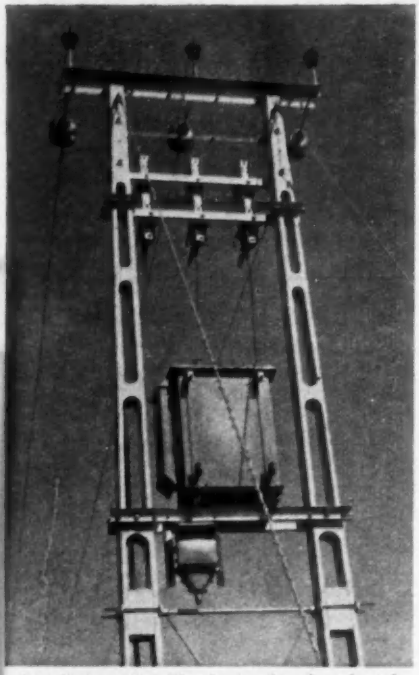
After consultation with the Ministry of Works, decisions on definite broad principles in the design of the poles were made, and it was decided that this should be developed on B.S.S. 1320 construction.

In implementing these decisions the poles were designed for an ultimate load of 1,250 lb with an overall length of 36 ft, and weighing 11 cwt approximately. The cross section at the extreme end of the butt measures 17in. by 6in. and its bearing surface is considered sufficient in normal cases to render the use of kicking blocks unnecessary. The area at the tip measures 6 in. by 5 in.

The design of the pole is in bays throughout its whole length, progressively increasing in



A pole on the Childerditch-Brentwood line (Photo, courtesy Costain Concrete Co. Ltd.)



Detail view of an H-pole showing clamping of components (Costain Concrete Co. Ltd.)

length from 3 ft for the top bay to 4 ft 3 in. for the bottom bay to ground level. Two-bay formations in decreasing lengths continue to a depth of 6 ft below ground level. This bay formation ends at some 4 ft from the tip of the pole, and this space provides for the anchorage for the crossarm steel work for the insulators' suspension and other necessary equipment. Seventeen such poles were erected, including two adapted for use as an "H" pole.

Obviously the provision for fabrication and attachment of apparatus to concrete poles has not the flexibility given by the wood pole. Whereas any alteration or additional fabrication required to the latter can be readily carried out on site, it is necessary to design in advance of manufacture of the concrete pole if costly and unsightly clamping devices are to be avoided. The problem, however, need not be a serious one because much can be done in standardisation through knowledge of requirements gained by pooling the ideas and experience of the district engineers. There will be for example, ample data existing of the varying circuit arrangements as applied to the l.t. pole, and it is considered that 95% of these requirements could be incorporated in a single designed concrete pole through co-operative planning.

Standardisation in fabrication could also be applied to the h.t. pole, and a stage further is envisaged when the requirements for both types of poles, at least for straight line work, will be centred in one design. "Where there is a will there is a way." Because the "H" and angle pole form a small percentage of the total requirements, it may not be an economic proposition to provide for their fabrication in the standard design.

Costs

On the Childerditch line use was made of existing fittings designed for wood poles, and in these circumstances costs were unnecessarily high.

The cost compared with those for medium and stout wood poles is high, but on account of the present small demand for the pre-stressed pole, production methods are not yet fully organised.

There is no available data concerning the results from carrying the working stresses and weathering over a number of years, but it is reasonable to anticipate that these poles are indestructible. On this assumption, and over a long period, costs will actually work out less than the wood pole, on account of the inspection, maintenance and replacements required by the latter from time to time.

The use of these poles in the first place was restricted to B.S. 1320 light line construction, but in view of the experience obtained and further technical data placed at our disposal, lines of more conventional design, up to and including ·15 sq in. copper conductors might well be erected with every degree of confidence.

Too much consideration cannot be given to the question of standardisation of pole design, to which reference has previously been made. The problem is not insurmountable, and attention to such matters as the spacing to be given between various pieces of equipment, cabling arrangements, and in the case of an "H" pole the actual positioning of the transformer, is very necessary. On first thoughts these may appear to be superficial matters, but such details can either make or mar the general appearance of the work.

The durability and general appearance of pre-stressed concrete poles suggests an attractive proposition, and if we care to synchronise the technical requirements with the principle of aesthetics, we shall be handing down to posterity a product far more pleasing in appearance than the unsightly wooden poles inherited from our grandfathers.

MANUFACTURING PROGRESS IN 1949

No. 3.—A. Reyrolle & Co. Ltd

IN addition to an increased output of the already established range of standard Reyrolle products, no less than three new units were introduced during the year. The construction of a new workshop with 14,400 sq ft of floor-space and a height of over 40 ft for the erection of the larger E.H.V. switchgear is well advanced. Steps taken during the year to increase production resulted in a record output, which was reflected in considerably improved periods for delivery of a number of standard equipments.

E.H.V. Switchgear

Small-oil-volume switchgear for voltages from 33 kV to 132 kV continued in good demand, and initial installations were ordered for industrial use and power distribution in Great Britain in addition to many extensions of existing switchgear overseas.

Part of the 66 kV air-blast switchgear comprising the first stage of equipment for one of the B.E.A. Divisional power-stations was tested and made alive during the year. Other air-blast switchgear, with ratings up to 3,500 MVA at 132 kV, was also built and the facilities available on the completion of the new workshop mentioned above will soon enable the output of both air-blast and small-oil-volume switchgear of these classes to be increased substantially.

A large number of 33 kV 1,500-MVA bulk-oil-volume metalclad panels were produced for overseas, and the 33 kV 500-MVA single-break outdoor single-tank circuit-breaker proved to have quickly established itself, a considerable number of orders being received.

Draw-out Switchgear

The company's standard range of horizontal-draw-out 3·3 kV to 33 kV metalclad switchgear, the short-circuit making-capacity and breaking-capacity ratings of which were extended (the range now includes ratings up to 1,500 MVA with panel centres of 5 ft 3 in.), was in great demand, a significant increase being noted for 22 kV switchgear from overseas. Many orders for this range of switchgear, as well as for similar equipments for medium-voltage, were received from industrial users.

Production of 400 V and 3·3 kV air-break switchgear for industrial application for the control of power-station auxiliaries was augmented to meet the increasing general demand for air-break equipment.

The range of vertically isolated oil-break switchgear was extended by the addition of a non-extensible indoor ring-main unit with two isolators and a tee-off circuit-breaker with ratings of 150 MVA at 6·6 kV and 250 MVA at 11 kV.

Distribution Gear

A steady flow of orders was received for the standard range of medium-voltage HH distribution switch-and-fuse gear, and also for corresponding flameproof switch-and-fuse gear.

Type-GP cartridge fuse-links, as used in HH distribution-gear, were also supplied for general use and for inclusion in various kinds of distribution fuse-boards.

Mining Gear

Another unit was added to the extensive range of class-GA coal-face flameproof equipments, namely type-HGA6, which is a 3,300/110 V or 240 V 2 kVA main-road lighting-transformer panel. A specially equipped type-GA1 contactor-panel for the control of two motors driving a very long and heavy chain-conveyor used in conjunction with coal-ploughs was also developed and supplied.

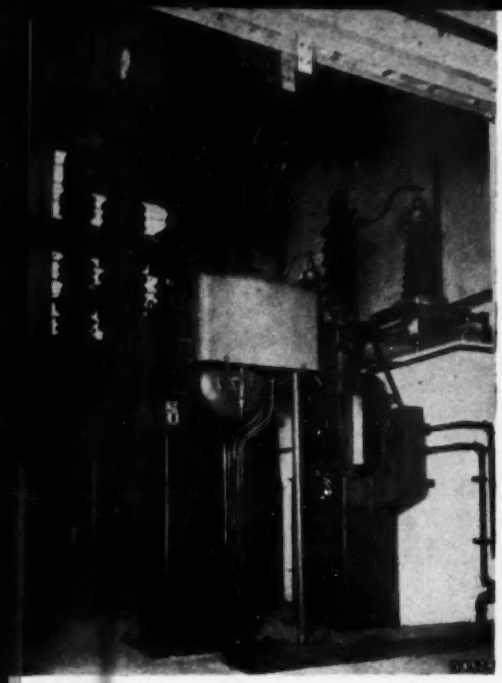
Among the numerous orders received for mining equipment were two notable ones covering nearly 900 gate-end and other panels of various types for eastern Europe. Some 6,600/3,300 V and 550 V transportable sub-stations were supplied to Canada, these being the first mining-transformers equipped with integral circuit-breakers and flit-plugs for 6·6 kV manufactured by the company.

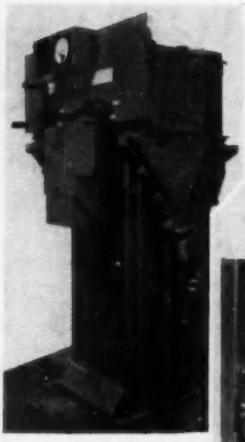
Rotary Equipment

The sale of variable-speed a.c. commutator motors was maintained at the same level as for 1948, but there was some contraction in the market for induction motors and welding sets, the set-back being largely due to the import restrictions of overseas countries.

A number of true-sine-wave alternator sets for the accurate testing and calibration of meters were supplied during the year, one being for the National Physical Laboratory.

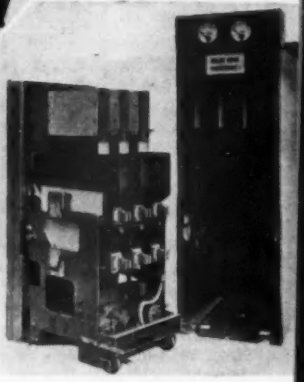
The general picture presented by the year's work is therefore one of continued and satisfactory progress in the production and development of switchgear.





On left: Reyrolle class LDI indoor ring main tee-off unit for 11 kV

Below: Reyrolle type S27A air break unit, 800 amp 3·3 kV with breaker withdrawn



On left: Reyrolle type OB air-blast circuit breaker, 800 amp 66 kV, installed in a BEA power station

No. 4.—Brush Electrical Engineering Co. Ltd

DURING the past year considerable advances have been made in the development of Brush products.

Transformer deliveries to overseas markets include three 7·5 MVA, 66 kV units for the Government of Bengal; two 3·75 MVA, 60 kV, 3-phase units for a Danish cement mill; two 4 MVA impulse-tested transformers for the Government of Travancore; and a large number of 250 and 500 kVA units for the Bombay Electricity Supply and Tramway Company. Home deliveries include two 20 MVA, 33 kV transformers for the B.E.A., Neath, and ten 1 MVA units for the Shell Marketing and Refining Company, in addition to over a hundred 500 kVA transformers for the B.E.A. Orders in hand include one 37·5 MVA generator transformer for the B.E.A., Warrington; two 30 MVA, 132 kV transformers with "on-load" tap-change gear for the B.E.A., Folkestone; four 10 MVA, 66 kV units for the Midland Electricity Board; and two 12·5 MVA, 33 kV transformers for the East Midlands Board.

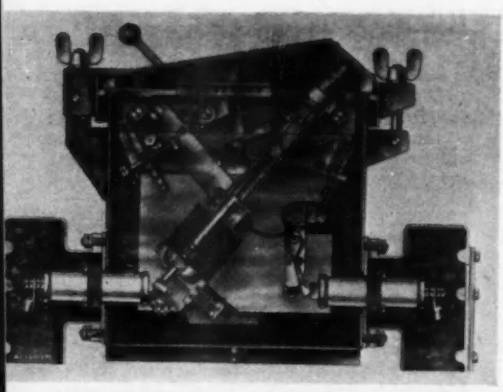
Export Orders

Export orders include thirty 2·5 MVA units for the Rand Mines Power Supply Company, South Africa; a 25 MVA, 88 kV bank for the Southern Rhodesia Electricity Supply Commission; two 20 MVA, 66 kV banks for New Zealand Hydro; two 10 MVA units for Denmark; nearly fifty transformers for Ontario Hydro-Electric Power Commission; and twelve 10 MVA, 110 kV banks for the Hydro-Electric Commission of Tasmania.

The turbine department has delivered an axial flow geared passout set for a cotton factory in Lancashire and the second of two 20 MW Ljungstrom sets to the B.E.A., Lincoln. Orders in hand include a 2,500 kW gas turbine for the Metropolitan Water Board; a 30 MW Ljungstrom set for the B.E.A., Warrington; several small Ljungstrom machines for cement works in India and Africa; besides a number of axial-flow machines for sugar mills in Mauritius and Natal. Of particular interest is a 15,000 h.p. turbine for compressor drive required by the Ministry of Supply in connection with gas turbine testing.

Switchgear

Switchgear despatched during 1949, included a considerable quantity of high rupturing capacity fuse-switchgear for l.v. service and vertical draw-out units for h.v. and l.v. duties in industrial establishments and for supply authorities. Switchgear to control diesel-alternator sets also figures prominently. An interesting delivery is a switchboard of 46 panels for Messrs. Petrocarbon Limited, who are concerned with the production of oil derivatives. This includes vertical draw-out units of 100 MVA breaking



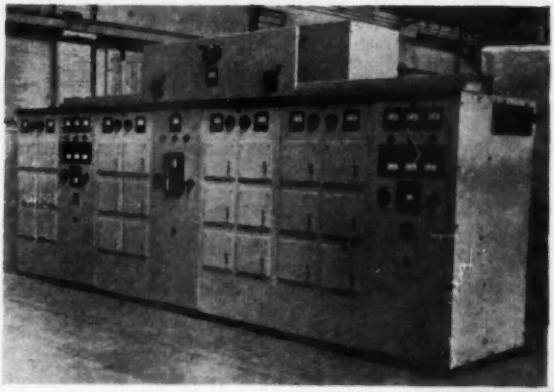
MW alternator for gas turbine drive, destined for the Dundee Power Station of the North of Scotland Hydro-Electric Board, is nearing completion.

Electrolytic generating sets include several machines for use in India. Over two thousand 55 kW alternators have been dispatched during the year for supply to the Russian Trade Delegation.

On left: Sectional view of Brush oil switch-fuse for 11 kV service, fitted with cross-jet arc control pots and series isolators for automatic tripping of all phases simultaneously

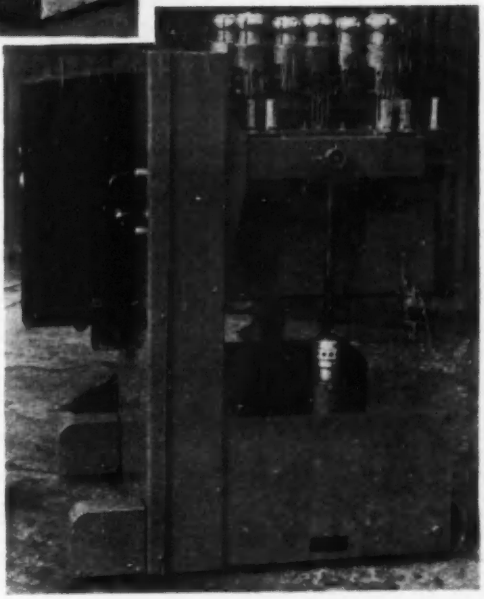
Considerable deliveries of the new range of flameproof motors have been effected, including a large number for the export market.

A further delivery of diesel-electric shunters for British Railways has been completed during the year, and orders in hand include machines for the Steel Company of Wales and power units for Spain.



On left: Brush flush-fronted industrial distribution board composed of switch fuses and oil circuit-breakers

Below: Brush truck-mounted low tension oil circuit-breaker unit for vertical plugging metalclad unit, rated for a breaking capacity of 3,000 amp



capacity for 3·3 kV, and 30 MVA l.v. units, all remote electrically-controlled from a desk-type switchboard. For paper mills and similar heavy duty installations, a line of vertical draw-out units for 1,000, 2,000 and 3,000 amp normal current rating and 30 MVA rupturing capacity have been produced. A truck mounted 3,000 amp oil circuit-breaker, with electrical operating mechanism, was another order of interest. The range of high voltage vertical draw-out units dispatched included many for 250 MVA breaking capacity for 6·6 and 11 kV service, these having spring close or solenoid operating mechanisms.

Now on the market is an 11kV, 150 MVA oil switchfuse, designed for use either for independent or transformer mounting and most suitable for ring-main duty.

Several 1,000 kVA, 6,000-V alternators for the North of Scotland Hydro-Electric Board, and similar machines for Syria, Iceland, Argentine, Australia and India have also been delivered. A 12·5

NEW LITERATURE

Electrical Contractors' Year Book 1949-50

NOW back to its pre-war size, the 1949-50 edition of this Year Book is again a mine of information, including, as before, a list of the members of the E.C.A., both alphabetically and in section order. Embodied, is a summary of the agreement between the Association and the B.E.A., relating to contracting and retailing. Further sections are devoted to legal information, the Fair Trading Policy, and working conditions and rates of pay, making the volume invaluable to contractors. Published by the Electrical Contractors' Association, 650 pages, 7¼ in. x 4⅝ in. Price 10s.

Overhead Line Practice

by J. McCombe

FOREMEN and linesmen, as well as engineers have been kept in mind by Dr. McCombe in writing this review of contemporary practice, and such is his success in meeting their needs that the student is also provided for—he will find in the volume much useful practical information to supplement his theoretical knowledge and to give a heightened air of reality to his studies. Some notes on surveying open the work, and these are followed by short chapters on planning, consents and the transport of materials. The main business of the book is reached with a chapter on foundations and excavation, and here becomes apparent the pattern that marks out the book, ample illustration, sample calculations, tabulated information and comment based on wide practical experience.

Further chapters deal with wood poles, support and cross arm design, insulators, staying and conductors. Sag-tension calculations are tackled without emphasis on the mathematical difficulties, and the book concludes with notes on clamps and joints, conductor erection, and general practice. All-in-all, this volume seems destined to become a worthy standard reference. Published by Macdonald and Co. (Publishers), Ltd., 269 pages, 8¼ in. x 5½ in. Price 25s.

Radio Frequency Heating

by L. Hartshorn

HIGH-FREQUENCY heating is a subject which can be considered from several aspects. The student, for example, interested in the theory of the subject requires quite different information from the practical engineer who merely wishes to utilise h.f heating as an industrial process and is indifferent to theory. Here is a happy combination of theory and practice which will provide a sound grounding in the principles and application of both induction and dielectric heating. The author has dealt with theory with admirable simplicity and clarity. Information is given on approximate costs and the history of the subject, while for those requiring detailed information beyond the scope of the book there are more than 90 references to other published information. Published by George Allen and Unwin Ltd., 237 pages. 103 illustrations. Price 21s. net.

BERLIN WEST RECONSTRUCTION

A COMMENDABLE effort on the part of the German authorities in the rehabilitation of the Berlin West power station has evoked much comment. This station was one which the Russians stripped prior to the arrival of the Allied forces. In April 1948, the reconstruction began by the ordering of two 350,000 lb/hr 2,000 lb/sq in. 932° F Benson boilers, one 26 MW topping set, two 36 MW two-cylinder 324 lb/sq in. 807° F condensing sets and one 12 MW 324 lb/sq in. house set. The two boilers and the topping set were installed in the new boiler house partly constructed during the war, and the low-pressure sets in the old turbine house which had been stripped by the Russians. The assembly of the boiler plant started on May 9, 1949, and the plant as a whole was in operation by the end of November, 1949. This rapid construction was greatly aided by the high priority given to the work and the employment of picked erectors. At one time the number of men working on the station reached a maximum of just over 2,000.

The plant is designed for peak operation and rapidly fluctuating loads. Two 2,260 cu ft Ruth steam accumulator: capable of operating to a maximum pressure of 470 lb/sq in. are connected to the low-pressure range for steam regulating purposes. The anticipated coal consumption is about 1 lb/kwh generated.

During the blockade, 1,460 tons of equipment for the station were transported by air, many of the boiler tubes having to be cut to accommodate them in the aircraft.

Messrs. Siemen Schuckert acted as consulting engineers and main contractors, the turbine plant being manufactured in their works at Muhlheim, and the Benson boilers were made jointly by Durrwerke A.G. at Ratingen-Ost and by Verinigte Kesselwerke A.G. at Dusseldorf. The boilers are welded throughout.

Although this represents a remarkable effort on the part of the German erectors, it should be remembered in making comparisons, that the plant is comparatively simple to erect, and that the civil engineering work required was very little, the existing foundations and buildings being utilised.

CABLE FAULT LOCALISATION

Some Notes on the Use of Werren's Test

By G. W. STUBBINGS, B.Sc., A.M.I.E.E.

WHEN all the conductors of a multicore cable are earthed by a fault, simple bridge tests for localising the fault are useless and more complicated methods have to be used. One of the best of these methods is Werren's test, which gives the fault position from a simple formula from the result of two bridge tests taken one from each end of the cable. The derivation of the formula for this test is rather more complicated than that of the simple tests described in the handbooks, and a short discussion of the theory of the Werren test may be interesting.

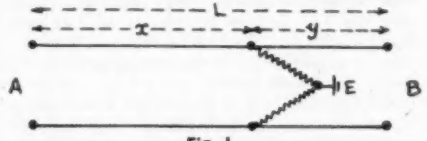


Fig. 1
Diagram of two cores with insulation breakdown

Fig. 1 is a diagrammatic representation of two cores of equal cross-section of a multicore cable in which there is a total breakdown of insulation at a point distant x from A and y from B end, $x+y=L$, being the whole length of the cable. The leakage paths due to the fault are from each conductor to earth and between the conductors. The delta system of leakage paths in Fig. 1 is equivalent to the star system of Fig. 2 in which the equivalent conductor lengths of the star leakage paths connected to the conductors are marked l_1 and l_2. When the conductors are joined together at the B end to form a loop, as shown in Fig. 2, the leakage paths of equivalent lengths l_1 and l_2 together with the part of the conductor loop between the fault and the B end of length 2y will form another delta system, and this can be converted to an equivalent star, as shown in Fig. 3. By the well known rules for the delta-to-star conversion, the equivalent length of the component of the star joined to the lower conductor will be $\frac{2yl_1}{2y+l_1+l_2}$ and that of the component joined to the upper conductor will be $\frac{2yl_2}{2y+l_1+l_2}$. The resistance of the third component of the star is irrelevant.

As the resistances of the actual leakage paths will generally be considerably greater than that of the conductor, 2y will be small in comparison with l_1+l_2, and the equivalent lengths of the two

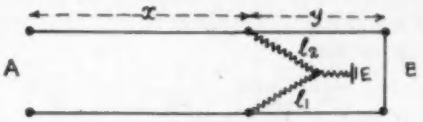


Fig. 2.
Two faulty cores joined at far end to form a loop

star components will be very nearly equal respectively to $\frac{2yl_1}{l_1+l_2}$ and $\frac{2yl_2}{l_1+l_2}$. The parts of the cable loop from end A to the fault, together with the two star resistances at the actual fault, will make up a loop having an equivalent length of $\frac{2yl_1}{l_1+l_2}+\frac{2yl_2}{l_1+l_2}+2x=2(x+y)=2L$ the same as that of the actual loop, and the fictitious loop will have in it a single earth fault at an equivalent distance $x+\frac{2yl_1}{l_1+l_2}$ from the A end. Assuming that the resistance of the leakage paths at the fault are constant, we can put $\frac{2l_1}{l_1+l_2}$ equal to k, a constant quantity, so that the distance of the fault in the fictitious loop from the A end is $x+ky$. If the A ends of the conductor are joined to make the loop and the B ends are free, then, similarly, the distance of the fault in the fictitious loop from the B end will be $y+kx$, still assuming l_1 and l_2 are constant.

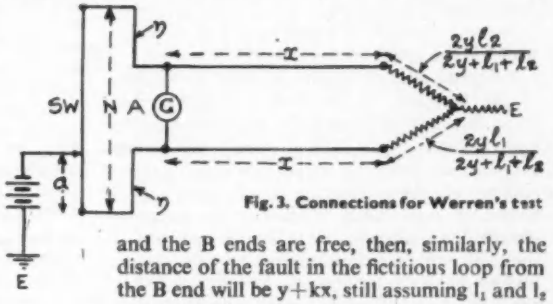


Fig. 3. Connections for Werren's test

In Fig. 3 the ends of the loop are shown joined together by a null-indicating instrument G, and a slide wire bridge SW with a wire N units in length connected to the cable loop by leads of equal resistance each equal to n units of length of the slide wire. If the bridge is

balanced with the adjustable battery contact at a distance a from the end of the slide wire joined to the lower conductor, the contact will divide the resistance of the slide wire and connecting leads at a fraction $\frac{a+n}{N+2n}$ of the whole resistance $N+2n$. This fraction will be equal to the ratio of the distance of the fault in the fictitious loop, $x+ky$ to the equivalent length 2L of this loop. Therefore

$$\frac{a+n}{N+2n} = \frac{x+ky}{2L}$$

Subtracting each side of this equation from $\frac{1}{2}$, we find

$$\frac{N-2a}{2(N+2n)} = \frac{L-x-ky}{2L} = \frac{y(1-k)}{2L}$$

If, the fault resistances remaining the same, the A ends of the cable are joined together and a similar bridge test is made from the B end, and b is the distance of the adjustable contact from the end of the slide wire joined to the lower conductor when a balance is obtained, then, similarly,

$$\frac{N-2b}{2(N+2n)} = \frac{x(1-k)}{2L}$$

Dividing this equation from the one preceding it, we obtain

$$\frac{N-2b}{N-2a} = \frac{x}{y}$$

from which both k and n are eliminated. Making the substitution $y=L-x$ we finally obtain

$$x = L \times \frac{\frac{1}{2}N-b}{N-(a+b)}$$

If l_2 is very large and l_1 negligible, the conditions correspond to a single earth fault on the lower conductor. In this case

$k = \frac{l_1}{l_1+l_2} = 0$, $a+b=\frac{1}{2}N$ and $\frac{1}{2}N-b=a$ so that

$$x = L \times \frac{a}{a+b}$$

which is the usual formula.

It should be carefully noted that the validity of the formula for the Werren test depends upon the assumption that the resistances of the leakage paths at the fault are the same for the two bridge tests. To guard against the possibility of these resistances changing, it is generally considered advisable to use two identical bridge equipments, one at each end of the cable with exactly similar connecting leads, and to make the second test immediately after the first. Another point worthy of note is that the equivalent length of the connecting leads does not enter into the final formula, so that the resistances of these leads are immaterial, provided that they are exactly equal and the same for both tests.

An examination of Fig. 3 will show that if $l_1=l_2$ then $k=1$ and the distance of the fault in the fictitious loop from each end of the cable will be $x+y=L$. In this case $a=b=\frac{1}{2}N$ and $a+b=N$. Substituting these values in the formula we find that $x = L \times \frac{0}{0}$, and the test fails.

It is therefore necessary when choosing the cores of a multicore cable to form a loop, to use those the leakage resistances of which to earth have the greatest difference. These fault resistances should be measured by a bridge method and not with an insulation test set, for the selection of the best pair of conductors to make the loop.

BRITISH STANDARDS

Soft Solders.—*B.S. 219:1949. Price 2s.*—During the war the number of grades of soft solder standardised was reduced to five, as a step in the plan to conserve tin. In this complete revision ten grades have been defined, five antimonial and five non-antimonial. It is considered that these will cover all common requirements. New methods of defining the maximum quantities of impurities are listed, and there are some slight changes in composition from earlier standards.

Conversion Factors and Tables.—*Addendum No. 1 to B.S. 350:1944. Price 2s.*—Additional definitions, conversion factors, tables, etc., relating to cubic measures, weights, pressures, heat flow, viscosity and traffic units are included in this amendment, which also contains an index to the definitions, factors and tables included in the original standard and this addendum.

Tests for Water used in Steam Generation.—Group A. Control Tests.—*B.S.1427:1949. Price 7s. 6d.*—Drawn up as part of a series of British Standards dealing with boiler-water treatment, this standard has as its main purpose the ensuring of the maximum degree of uniformity in methods for making the tests and in the manner of expressing the results. Only tests of a simple character are dealt with here, and they can be performed even when laboratory facilities are not available. Full instructions for making the tests are set out, and they are divided into two grades of difficulty. Appendices contain detailed information on the preparation of indicators, etc., and tables giving abbreviations, equivalents and conversion factors.

Nickel and Nickel Alloy Soft Drawn Tubes for General Purposes.—*B.S. 1531-33. Price 2s.*—This standard completes the series for nickel and nickel-alloy products. It covers malleable nickel, nickel-chromium and nickel-chromium-iron tubes, laying down chemical composition and mechanical properties.

British Standards reviewed above can be obtained post free at the prices stated from the British Standards Institution (Sales Dept.), 24 Victoria Street, London S.W.1.

PROBLEMS and PRACTICE

In Engineering

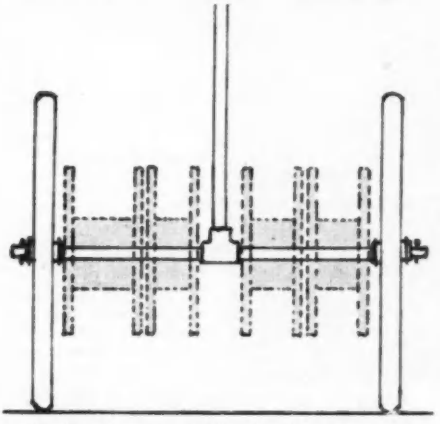
Mobile Cable Stand

A LOT of trouble in wiring can be saved by proper attention to the cable as it comes off the drum or coil, especially when working on conduit or lead sheathed systems. Tired of temporary set-ups, such as wooden boxes on end, and lengths of conduit to support the cable drums, the following arrangement was devised.

Two cycle front wheels, with the ball bearing cups knocked out, at once form a support for the drums, and also means of conveyance. The axle consists of two equal lengths of ¾-in. screwed conduit joined by a conduit 'T' piece in the middle. The handle lay-out similarly uses a 'T' piece.

The free ends of the axle carry short lengths of round m.s. rod driven in the conduit and pegged, or for that matter, a full length rod can be driven right through. Cotter holes and cotters serve to locate the wheels. Should the wheel hubs be too large a bore, they can, of course, be bushed with turned brass bushes.

Suitable small drums can be obtained, and modified so that one flange, or side, is detachable, and secured by three large wood screws. If necessary, the drum pivot hole can be

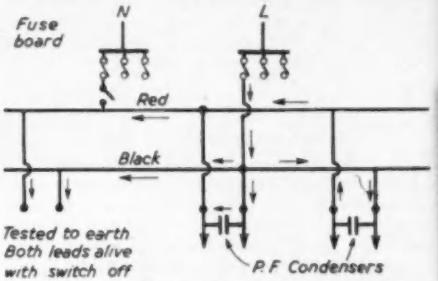


Bicycle wheels are modified for this cable stand

bushed to make an easy running fit on the conduit axle. The detachable flanges, of course, enable coils of cable to be slipped into position very quickly. Dimensions naturally vary with the materials available, but in all cases the width of the stand should be such that it can pass through the ordinary doorway. Tyres and tubes can be fitted to the wheels, or they can be bound with a suitable tape.—*F.S.*

P.F. Condensers give Lamp Shock

WHILST replacing a fluorescent tube in a large showroom I received a shock when accidentally touching a terminal in the fitting and with my other hand resting on the metal frame. I immediately verified the switch controlling the fitting was switched off and proceeded to test the supply to the earthed fitting.



Current path with switch in neutral circuit

I found both red and black wires alive to earth with the switch in "off" position. With the switch on, only the black lead was alive and the fitting worked normally. Having noticed before the fluorescent were switched in banks of threes, I came to the conclusion that the switch was in the neutral lead and that I was getting a feedback through the power factor condensers in the other two fittings. This was found correct when I changed over the mains leads, behind a fuse box where they had been wrongly connected.—*K.W.*

Wiring System Acts as a Condenser

SOME years ago, the Surrey County Council built a sanatorium at Milford. Among the many buildings, there were a number of bungalow blocks used as wards, each of which was approximately 100 yards long, consisting of a long corridor with bedrooms off the corridor along its length. At the carcase stage of building, before any plastering had been commenced, the wiring for the lighting was installed in lead covered cable, and the circuits connected to two iron-clad distribution fuseboards situated in the corridor of each block. The lead covered cables were bonded to the fuseboards by a ¼ in. screw to 3/029 twin lead-covered bonding coupling. The method of installing the wiring was by fixing it to a board laid in the roof space on which the lead covered cables were run in parallel lines for appreciable distances before turning off to the points or switches. When the installation was connected at the various junction boxes to the lighting points and switches without fittings

fixed, an earth test was conducted on the system between the conductors and the distribution fuseboard, which was earthed.

The insulation tester used generated 500 V d.c., and the results of this test indicated an infinity reading for resistance.

It was noted that by carrying out this test the system functioned as a condenser and held the electrical charge induced from the generator in the "Megger" until such time as it was discharged.

In one instance an operative, after having conducted the test, sustained a severe shock which temporarily incapacitated him by touching the fuseboard with one hand and holding the bared and bunched ends of the circuit wiring with the other. There was no electricity service or power generation on the site.—*J.C.*

Locating a Cable Fault

THE Wheatstone Bridge method of locating a fault on a 2-core cable indicating a high resistance between cores and sheath, as described by I.A.V. in the ELECTRICAL TIMES of December 29, is a clever dodge to have at one's command. There would appear, however, to be an error in the solution given.

Referring to Fig. 3 derived from Fig. 1, the variable resistance C should be included in the ratio arm associated with x.

We would then have at balance

$$\frac{x}{y} = \frac{R+C}{R} \quad \text{.....Eq. 2}$$

which when combined with Eq. 1, i.e. $\frac{x}{y} = \frac{a}{b}$

would give the solution $R = \frac{bc}{a-b}$

—*B. L. Stanforth, A.M.I.E.E., Folkestone.*

Some Snags in Fault Location

WITH reference to the correspondence in the issue of December 29, I offer the following comments for publication in your "Problems and Practice."

The localisation of the cable fault in a twin p.i.l.c. cable with both cores faulty to earth is undoubtedly a difficult task with the fault as it stands.

The "Open and Closed" Murray's loop is a simple test, and is described in the useful references given by J.L.G. In the diagram, a Murray's loop test is made from one end; first with the loop open at the far end, call this ratio N_1; second with the loop closed, call this ratio N_2. The test will fail if N_2 is near half, i.e. the faulty cores have nearly identical fault resistances to earth.

Distance from test position to fault

$$= \frac{N_2 - N_1}{\frac{1}{2} - N_1} \times L$$

where L is the single route length, and N_1, N_2 are the slide wire ratios.

The fault resistances must be steady for a successful test, so that it is advisable to attempt to break down the fault to earth of one core. In favourable circumstances, it may be possible to reduce the fault resistance of one core to such a value that the ratio N_1 is nearly zero, when the expression above becomes:

$$\text{Distance} = \frac{N_2}{\frac{1}{2}} \times L = N_2 \times \text{loop length}$$

i.e. the normal Murray's loop is now applicable.

The method given by I.A.V. is evidently similar to the "Open and Closed," without the outstanding simplicity of the latter. The close correspondence of the two methods can be seen by letting a = b in the equation:

$$R = \frac{a\,c}{(b-a)} \text{ given by I.A.V.}$$

This corresponds to letting $N_2 = \frac{1}{2}$ in the "Open and Closed" equation, when the fault resistances to earth are identical, and both methods fail. The preliminary reduction of one of the faults is therefore well worthwhile, as it causes the fault resistances to diverge; and the greater this divergence the closer the test becomes to the ideal of Murray's loop.

The voltmeter method described by J. Sumner is not applicable to faults on power cables; though it may be applicable to telephone cables where the resistance of the conductor is much greater, and due to the absence of impregnation the fault resistance is commonly lower.

Taking the distance to the fault as 1,000 yds (for 0·1 sq in. gives 0·25 ohms) and a test current of 100 m.a. we have:

$VA_1 = (2r_1 + R_f)\ I = (2 \times 0{\cdot}25 + 10{,}000)\ 0{\cdot}1$
$= 1000{\cdot}0500$ volts.

$VB_1 = IR_f = 0{\cdot}1 \times 10{,}000$
$= 1000{\cdot}0000$ volts.

It is, of course, not feasible to measure voltages (or resistances) to such accuracy; nor will the fault resistance be stable to this order of accuracy. Methods of measurement based upon the difference of two nearly equal quantities are subject to gross errors, and should be used with reservation.

Blavier's test, and the earth overlap test, are examples of tests based upon the difference of two measurements, and therefore subject to the criticism outlined above.—*J. G. Boggis, Graduate I.E.E., Barking.*

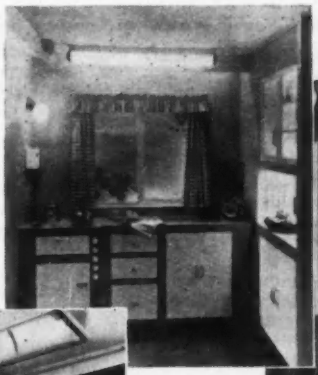
Contributions to this page dealing with specific problems and items of interest to practical engineers are welcome and will be paid for at our standard rates. They should preferably be accompanied by sketches which will be redrawn for publication.

Contributors should state whether or not their names are to be published if their notes are accepted.

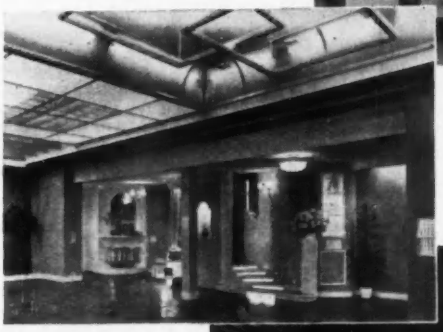
THE LIGHTING SERVICE BUREAU

Some of the New Exhibits On View

The main entrance hall of the Lighting Service Bureau has been completely remodelled and a number of new and attractive ideas are displayed. This page shows some of the various sections

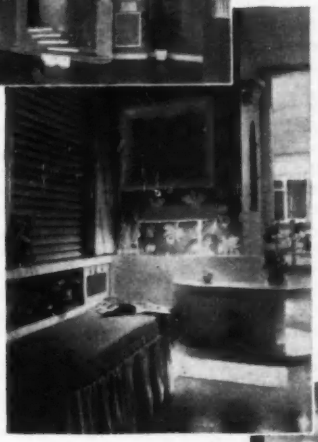


On right: Two methods of general lighting for the cooker and sink fitment, using a 5-ft fluorescent lamp behind a pelmet and a 4-ft ceiling-mounted enclosed fitting. On the left a tungsten fitting provides extra local lighting



Above: Glass cupboard with a 3-ft fluorescent lamp beneath opal glass in the base. The same lamp illuminates the alcove above, a treatment which could be applied to either a working surface or a service hatch. The glass bricks might be similarly included in an actual house to admit natural lighting during the day

Above: An general view of the domestic section which also shows three ceiling treatments for use in public, commercial or industrial buildings, including saw-tooth treatment (extreme left), louvered ceiling (centre) and bare lamps behind anodised expanded aluminium, with indirect fluorescent lighting on suspended fittings



On left: Domestic fixture with lighting between shelves and swinging fluorescent reading lamp. The shelf lighting is suitable for pilot lighting while viewing television and for night nurseries and other situations requiring a subdued light

On right: Looking towards the kitchen end of the domestic section. Demonstrations include curtains illuminated by a fluorescent lamp behind the pelmet; shelves and panels lit by both filament and fluorescent lamps; an illuminated niche in a cupboard door; a kitchen demonstration with a false window; lighted china and glass cabinets; and three different methods of lighting for staircases

OVERSEAS NEWS

Power Commission for New South Wales

The decision to establish an Electricity Commission to control the generation of electricity throughout New South Wales, was taken last month by the State Cabinet. Mr. McGirr, the State Premier, said the Commission would consist of a chairman and two members, but no appointments have yet been made, nor have their salaries been fixed. It is reported that the present Emergency Electricity Commissioner, Mr. Conde, would be offered the post of chairman. Mr. McGirr said that at first the Commission would direct only the activities of the four existing major authorities—Sydney County Council, the Railways Department, Southern Electricity Supply and the Electric Light and Power Corporation. The Government would introduce legislation soon to set up the new Commission and empower it to become ultimately the overall State generating authority. He hoped that the draft legislation would be ready for the next sitting of Parliament —in February. The object of the Commission, he said, would be to overcome difficulties inherent in the present system and to obtain the benefit of a properly integrated generation system. The present four major authorities provided between them about 96% of the electricity generated in the State, Mr. McGirr said, and each of these authorities was carrying out an expansion programme, but the disappointing rate of progress suggested that the work might be beyond the resources available when applied individually.

Mr. McGirr explained that the ultimate objective would be to set up a direct Government organisation to generate all power supplies in bulk on the State's interconnected system. Distribution to consumers would be carried out by local authorities. He said two investigations—one by Messrs. Rendell, Palmer and Tritton in 1937, and another by Mr. S. F. Cochran in 1944, had reached conclusions in line with the State's proposal.

Since the publication of these proposals the Sydney County Council and the Local Government Association have both voiced their protests. The former considers that the setting up of a Commission would be a step towards socialisation, and not in the best interests of consumers.

Australian Production

Factories in Australia making electrical goods and equipment produced 53,332 household refrigerators in 1947-48, compared with 29,499 in 1938-39. These are some of the figures given in a survey of the Electrical Industry issued recently. During 1947-48, local factories produced 28,738,411 dry batteries, 333,332 radio receivers and 85,779 vacuum cleaners, 83,392 fires and 15,117 washing machines.

Another Set for Richmond

Official approval has been given to the proposal of the Richmond River (Electricity) County Council, N.S.W., to install a new diesel engine generating set, and to raise a loan of £20,000 for the purpose.

Clarence River

The State Cabinet has decided to set up an interim authority for the development of the Clarence River, N.S.W. An investigating committee has already reported that hydro-electric power development and flood mitigation work were possible on the Clarence and its tributaries. It has been estimated that 400 MW could be developed at 50% load factor.

Dockyard Work

As a result of negotiations just completed in Gt. Britain, the New South Wales State Dockyard will build auxiliary equipment for the Collawara power station, on the south coast. The main plant for the station is being supplied by British firms. Mr. McLarty, director of the Dockyards, has been in Britain to make the necessary arrangements.

Tasmania's Development

The State Cabinet has agreed to the recommendation of the Hydro Electric Commission of Tasmania that the discount rate on ordinary consumers' accounts be reduced as from January 1, 1950, from 16⅔% to 5%. In its annual report, presented in the Legislative Council a few days ago, the Commission declared that revenue must increase to cover the higher wages and costs of materials. The report shows a net surplus of £4,198 for the year 1948-49, but no appropriation has been made towards financing rural extensions, or to general and contingency reserves. During the year, 198 miles of h.t. lines and 172 miles of l.t. lines were erected—an increase of about 25% over the previous year. New consumers numbered 3,811, of which 2,401 were outside the city and suburbs of Hobart and Launceston. A further 7,002 cookers and 3,086 water heaters were also connected. The Commission estimates that 87·8% of dwellings in Tasmania were receiving a supply.

Long o.h. Line Span

The State Electricity Commission of Victoria has ordered nine miles of special s.c. aluminium cable from British Insulated Callenders' Cables Ltd. This cable is to be used for the six conductors of the 220 kV Kiewa-Melbourne transmission line across Eildon reservoir which will incorporate an unbroken span of 7,300 ft—the longest single span in Australia. The cable, comprising 37 strands of steel and 54 strands of aluminium wire, will be approximately 2½ times as strong as the conductor cable for the rest of the 158 mile transmission line from Kiewa to Mel-

bourne. It is being manufactured for the contractors by Metal Manufactures Ltd., of Port Kembla.

Ontario's Steam Plant

A further steam generating plant, at Thorold, near St. Catharines, was put into operation last month by the Hydro Electric Power Commission of Ontario The Commission hope to have a total of 61 MW of additional steam plant in operation before the end of this month.

Exporting Power

A committee of Scandinavian power engineers has recommended to their respective governments that arrangements should be made for the export of 600 million units p.a. from Norway to Denmark, via Sweden, to commence from July, 1953. Total cost of the equipment and e.h.t. cable necessary is estimated at about £8,280,000, of which about 60% would be paid by Norway and 30% by Sweden. It is further suggested that Marshall Aid funds should be utilised to obtain some of the equipment from the U.S.A.

Nationalisation in Hungary

The Hungarian Government, on Thursday last, put into effect a nationalisation decree affecting all trade and industrial concerns employing more than ten persons still in private hands or financed by foreign capital. Among the electrical concerns involved are the Standard Electric Co., Hungarian Telephone Manufacturing Co. (both American owned), the Philips Radio Co. (Dutch subsidiary), and Brown Boveri (Swiss).

Lampholder Enquiry

The Indian Tariff Board is shortly to hold an enquiry into the case for the protection of the local brass lampholder manufacturing industry. Questionnaires have been circulated to interested concerns, and it is expected that the information will be considered within the next few weeks.

Cape Railways

Details of the modifications to be applied to the Cape suburban railway system, were given recently by the Cape System electrical engineer of the South African Railways. The major change would be the adoption of 3,000 V for operation in place of the present 1,500 V, bringing the suburban system into line with the new main lines. As part of the scheme, the railways had taken over all existing traction substations from the Electricity Supply Commission, for conversion from 1,500 V to 3,000 V and was building thirteen new ones. One of these, at Salt River, may be the largest traction substation in the Southern Hemisphere. With the increasing passenger traffic, the existing converting plant was fast becoming seriously overloaded.

The 96 train motor units now in use on the Cape System were to be stripped of their motors and used as passenger coaches. Some of these had completed more than 1,000,000 miles of service, and about 125 new and more powerful motor coaches would eventually replace them. In the transition period, it would be necessary to operate the main line and Cape Flats sections on 3,000 V, while the suburban line would continue to run on 1,500 V.

Water Heater Design

The Auckland Electricity Board, N.Z., decided last month, that as from April 1 next, it would refuse to give a power supply to new hot water systems which did not comply with a standard specification. It was also agreed to establish a station to test the design of water-heaters so that a standard mark could be issued to the manufacturers. It is planned to set up such testing stations in the main centres.

Construction at Maraetai

Following recommendations by the visiting American consulting engineer, Mr. J. L. Savage, precautionary tests are to be made in the U.S.A. and N.Z. to establish the physical characteristics of the rock at Maraetai power station, New Zealand. Mr. Savage had observed that although the physical characteristics of the foundation and abutment rocks as determined from laboratory specimens were satisfactory generally, the major jointing, and more particularly the columnar jointing, of the rock, warranted careful consideration. An officer of the chief designing engineer's staff of the M.O.W. of New Zealand has already left for Denver, Colorado.

British Tenders for Seattle Plant

Two British firms are making a strong bid for orders for electrical plant for the Seattle City Light, a municipally-owned undertaking, according to recent reports. For the supply of nine water-cooled transformers, Ferranti Ltd. have submitted the lowest tender of £248,000, the tender of the English Electric Co., Ltd. following at £274,000. The lowest American tender for this plant was £282,000, it is stated, the highest being £402,000. For six forced oil-cooled transformers, the Ferranti tender, at £183,000, was again the lowest, being followed by tenders from the English Electric Co., and five well-known American manufacturers. The English Electric Co. submitted the lowest tender, of £48,000, for two rectifier units and switchgear, but it is reported that this did not meet the specification, although it was being considered. We understand that the Seattle City Council has been asked if there was any objection in principle to the placing of large orders with foreign firms, but apparently, although the city's charter stipulates that local firms should be given preference, this would not apply in the present instance for there were no local tenders submitted. The British tenders, however, include an adjustment clause covering possible increases in the cost of labour and materials, which it is thought, might affect the decision adversely.

PERSONALITIES

In the Industry

Recently appointed general sales manager of the National Gas Engine and Oil Engine Co. is **Mr. H. B. McAuslan,** who, since the war, has been superintendent engineer to the British and Burmese Steamship Navigation Co. in addition to holding the position of technical adviser to the Irrawaddy Flotilla Co. Prior to the last war he was superintendent to the latter concern. The firm also announces that **Mr. J. C. Greaves,** who has been with the company since 1920, is retiring from the position of London manager. He is succeeded in that office by **Mr. F. D. Langley,** A.M.I.Mech.E., who joined the concern in 1930. He has been the National company's resident engineer for the power plant installation for the Colne Valley Sewerage Board's new Maple Lodge Disposal Works, which is fast completing.

As the result of the decision of the National Coal Board to split their Northern Division into two, new appointments are announced. Among these we note the name of **Mr. H. E. Collins,** C.B.E., M.Eng., M.I.Min.E., A.M.I.E.E., who is being released from his position as British chairman of the Combined Coal Control Group in Germany, to return to the mining industry as production director on the Board for the newly formed Durham Division.

Three new appointments have just been announced by Everett Edgcumbe and Co., Ltd. **Mr. W. Bamford,** B.Sc., M.I.E.E., is named as director of sales; **Mr. J. J. McManus** is now director of technical production, and **Mr. W. E. House** becomes chief sales engineer. They are already well known in the industry, and have been on the staff of the company for some years. Mr. Bamford joined the firm in 1936 as sales engineer, while Mr. McManus has been manager of the Test Department for twenty years. Mr. House, too, has been with the company since 1929, for many years as a member of the Sales Engineering Department.

Mr. W. Bamford

Mr. J. J. McManus

At the end of last month, **Mr. H. W. Bosworth,** A.M.I.E.E., chairman and managing director of Lancashire Dynamo and Crypto Ltd., retired from the position of managing director, but he will continue to act as chairman, and remains a director. Mr. Bosworth has had a notable career with L.D.C., extending over 43 years. He started with the firm as an apprentice, being subsequently appointed manager of the London office, and a director. It will be recalled that earlier this year he was elected chairman of the Council of B.E.A.M.A. for the year to April next. Mr. Bosworth's health has not been of the best of recent months, and this week he underwent an operation at King's College Hospital. We wish him a complete and speedy recovery.

Mr. H. W. Bosworth

Our congratulations to **Capt. H. Leslie Dixon,** of Leslie Dixon and Co. and Electradix Radios, on his election to honorary life membership of the Institution of Electrical Engineers upon completion of fifty years as a member. He extends his very best wishes to his numerous friends in the industry.

We understand that **Mr. F. S. Inglis,** M.B.E., M.I.E.E., formerly works manager of Thomas De La Rue and Co. Ltd. (Plastics Division) has now been promoted to joint general manager of their factory at West Chirton, Northumberland. It will be recalled that he joined that concern in November, 1948, as assistant works manager, and in January last became works manager.

On the retirement last month of **Mr. J. W. Hargreaves,** general manager of the Renfrew and Dumbarton Works of Babcock and Wilcox Ltd., **Mr. I. M. Lyon,** previously assistant general manager, has been promoted to succeed him. In turn, **Mr. A. S. Peacock** is now assistant general manager of the works.

An interesting ceremony took place last month at Telcon Works, Greenwich, when **Sir Geoffrey Clarke,** on retiring from his post as managing director, bade farewell to employees of the Telegraph Construction and Maintenance Co. Ltd. and Submarine Cables Ltd. On behalf of the employees, **Mr. J. N. Dean,** his successor, presented him with several valuable first editions as a parting gift.

Previously sales representative in Scotland for the General Accessories Co. Ltd., **Mr. J. D. Harris** has now taken up a similar position with Bill Switchgear Ltd. He had earlier served with J. H. Tucker and Co. Ltd. for many years.

Mr. B. Wray has now taken up an appointment in the North East as lighting engineer to Adamson and Co. (Tyne) Ltd. He was previously with the lighting department of Philips Electrical Ltd. in London.

Mr. C. W. Bloomfield has relinquished the chairmanship of Hackbridge Cable Holdings Ltd. but will continue in active control of the group's affairs as managing director. **Mr. C. I. Steen,** the deputy chairman, has been elected chairman in his place, and **Mr. A. L. Foulger,** the secretary, has been appointed to the board.

As successor to **Mr. W. B. Gibbs,** who recently retired, the Silvertown Company has appointed **Mr. C. R. Cushman,** A.I.R.I., A.I.I.A., as factory superintendent of the Silvertown Works.

Another to retire at the end of last month was **Mr. K. Baumann,** director and chief mechanical engineer to the Metropolitan-Vickers Electrical Co., Ltd. He has been succeeded in those positions by **Mr. Norman Elce,** M.Sc.(tech), M.I.E.E. Born at Zurich, Mr. Baumann was trained there before joining M.-V. in 1909 as turbine engineer. He has since been largely identified with the development of present-day steam power station plant, including turbines and boilers, and latterly the i.c. turbine; he was chief mechanical engineer to the company for 37 years. He has contributed numerous technical papers, dealing mainly with turbine practice. In 1948 he delivered the Thomas Hawkley lecture to the Institution of Mechanical Engineers, and a few months ago he was awarded the James Clayton prize by the Council of that Institution. His successor as chief mechanical engineer to the company, Mr. N. Elce, became assistant to Mr. Baumann in 1944, and was appointed assistant chief mechanical engineer in 1948. He joined the company as a college apprentice in 1920. Between 1926 and 1941 he has been responsible for the firm's industrial turbine installations. During the last war he assisted in special work in connection with the military use of atomic energy.

Mr. K. Baumann

Mr. N. Elce

Previously deputy sales manager, **Mr. H. G. Palfreman** has now been promoted to sales manager of Bill Switchgear, Ltd. Educated at Wylde Green School, Sutton Coldfield, and Aston Commercial School, he later studied at Sutton Technical College before joining the sales staff of Bill Switchgear Ltd. in 1937. He has since held a number of appointments, including Southern Counties representative.

Mr. H. G. Palfreman

On Friday, January 20, **Lord Citrine,** chairman of the B.E.A., travels to Paris to preside over a meeting of the Board of Trustees of the International Federation of Trade Unions. The meeting is to determine the disposal of funds of the I.F.T.U., that body having been wound up in 1945.

OBITUARY

We regret to record the death, on December 22 of **Mr. J. S. Nodes,** A.C.A., aged 41, chief accountant of the East Midlands Electricity Board. Prior to 1948, he had served with the Central Electricity Board since 1932, originally as assistant accountant in the South Eastern District, and latterly in the Central England District, where he became district accountant in October, 1939. He was educated at Margate College, and trained with the British College of Accountancy before being articled and engaged in London, in 1926.

Mr. J. S. Nodes

We note the death, on December 27, of **Mr. R. J. MacLeod,** aged 67, who was chairman and managing director of the Power Plant Co., Ltd.

The death occurred on December 31 of **Mr. S. S. Grant,** O.B.E., M.I.E.E., A.C.G.I., who was a director of numerous electricity supply companies. A memorial service is to be held at 12 noon on January 12 at St. Margaret's, Westminster.

It is with regret that we record the death, on December 28, of **Mr. A. C. MacWhirter,** M.I.E.E., aged 74, who was well known in the South Wales area. He started the firm of that name in Cardiff in 1906, after earlier experience with his father in Glasgow, and with the General Electric Co. of America. He was chairman of the I.E.E. Western Centre in 1921.

We note the death on December 28, of **Mr. H. M. Anderson,** A.M.I.E.E., electrical contractor, of Glasgow.

NEW YEAR HONOURS

THERE are many names of electrical interest in the New Year's Honours List published last Monday. Among the first to meet the eye, are the awards of the C.B.E. to **Mr. J. R. Beard,** M.Sc., M.Inst.C.E., M.I.E.E., senior partner with Merz and McLellan; to **Mr. J. Eccles,** M.M., M.I.E.E., M.Inst.C.E., M.I.Mech.E., chairman of the Merseyside and North Wales Board; and to **Mr. J. J. Gracie,** M.I.E.E., general works manager of the General Electric Co. Ltd., who is also chairman of the Greater Birmingham Local Employment Committee.

Other recipients of the C.B.E. are: **Mr. L. G. Semple,** M.I.E.E., regional director, North Eastern Region of the G.P.O., and latterly controller-general, Posts and Telecommunications, the Control Commission for Germany, British Element; **Lt.-Col. H. B. Somerville,** O.B.E., regional director, Northern Ireland region of the G.P.O.; **Prof. A. M. Tyndall,** D.Sc., F.R.S., chairman of the National Physical Laboratory Executive Committee; and **Mr. J. Anderson,** O.B.E., M.I.E.E., chief scientist, H.M. Underwater Detection Estab., Portland.

Mr. J. J. Gracie

Mr. J. R. Beard

Among those to whom the O.B.E. has been awarded are: **Mr. J. V. Foll,** managing director of Muirhead and Co. Ltd.; **Mr. Tom Golding,** A.M.I.E.E., manager of the electrical department of W. H. Allen Sons and Co. Ltd.; **Mr. J. Rankin,** F.C.I.S., secretary, Merseyside and N. Wales Board; **Mr. F. J. Chapple,** D.S.O., M.B.E., M.Inst.T., general manager of the Bristol Tramways and Carriage Co. Ltd.; **Mr. F. J. Lane,** M.Sc., M.I.E.E., transmission design engineer, B.E.A.; **Mr. H. C. Jones,** M.I.E.E., G.P.O. telephone manager at Liverpool; and **Mr. J. G. Pearce,** M.Sc., M.I.Mech.E., M.I.E.E., F.Inst.P., director, British Cast Iron Research Association.

Recipients of the M.B.E. include: **Mr. A. S. Brown,** manager of the Electric Department of Clarke, Chapman and Co. Ltd.; **Mr. R. V. Macrory,** M.I.E.E., city electrical engineer of Londonderry; **Miss Olive M. Forbes,** chief superintendent of women employees, Ferranti Ltd.; **Miss Agnes G. Gray,** statistician, South-West Scotland Division of the B.E.A.; **Miss Marguerite L. Limozin,** private secretary to Sir John Hacking, deputy chairman, operation, B.E.A.; **Mr. K. B. Ling,** superintendent, Standard Telephones and Cables Ltd., Treforest; **Mr. E. E. Page,** station superintendent at Llanelly generating station for eighteen years; **Mr. W. R. Scott,** M.I.E.E., chairman, Western District Committee, Scottish Board for Industry; **Mr. J. B. Stevenson,** works director, E.M.I. Factories, Hayes, Middx; **Mr. G. W. Warren,** physicist at the General Electric Co.'s research laboratories; **Mr. C. J. Whittall,** in charge of the Admiralty Division of Elliott Brothers (London) Ltd.; and **Mr. H. W. Wilson,** M.M., A.M.I.E.E. Admiralty liaison officer engineer, General Electric Co. Ltd., Birmingham.

In the list of awards of the B.E.M., we note the names of **Mr. A. J. Bradshaw,** works foreman, Bromley, London Electricity Board; **Mr. H. T. A. Charleston,** mechanical fitter, Camborne, Cornwall sub-area, South Western Electricity Board; **Mr. J. Connor,** D.C.M., mains foreman, St. Helens, Merseyside and N. Wales Electricity Board; **Mr. W. A. E. Daborn,** shop foreman, Submarine Cables Ltd.; **Mr. S. J. Gorvett,** turbine shift foreman, Pontypridd; **Mr. W. E. Read,** boiler house foreman, Birmingham, Midlands Division; **Mr. F. J. Sherry,** substation foreman, Finchley; and **Mr. J. D. Sweetnam,** assembly supt., E. K. Cole Ltd.

Overseas, the C.B.E. goes to **Mr. H. H. Bell,** chairman, Melbourne and Metropolitan Tramways Board; the O.B.E. to **Mr. A. W. H. Keen,** A.M.I.E.E., deputy chief mechanical engr., Crown Agents for the Colonies; and **Mr. A. Salomone,** manager, W. and Elec. Dept., Malta, and the M.B.E. to **Mr. E. V. Andlaw,** A.M.I.E.E., A.M.I.Mech.E., city electrical engineer, Gibraltar.

Mr. F. J. Lane

Mr. T. Golding

Mr. J. Eccles

Mr. E. E. Page

Spare Plant Planning

Simple rules are applied to give a first check on the adequacy of some U.S. power distribution extension schemes

SPARE plant must be carried by every supply undertaking to guard against outages of operating equipment. As systems have grown in size, however, it has become increasingly difficult to determine the rating of plant which must be at hand for use in emergency. Pointing out the need for rational plan to regulate the degree of supply continuity in all parts of a system, a recent American article records a set of basic rules which provide a first check on the sufficiency on any scheme considered by the Public Service Electric and Gas Co. of Newark, New Jersey.

The Author, a system planning engineer, states that the rationalisation of spare plant policy is much further developed in the field of generation than it is in transmission and distribution. During the 1930's the technique was evolved of comparing the merits of each increment of system capacity on a basis of "interruption kVAh avoided"—assuming that where spare plant was brought into operation, equivalent load would normally have had to be dropped in its absence.

In spite of some obvious shortcomings of this criterion, it demonstrated certain inconsistencies in planning—there was an investment of $50,000/"interruption kVAh avoided" for spare substation transformers as against $258 for spare subtransmission above a minimum of two lines/substation. The same criterion—"always prepare for one outage"—had been applied in both parts of the system. Similar studies enabled money value to be placed on the number of units serving a given load; adding a third cable when loads exceed the capacity of a single circuit costs less per "interruption kVAh avoided" than adding a fifth when the capacity of three is exceeded.

Wartime Practice

Later, under the stress of war conditions, it became the practice to count on the inherent overload capacity of networks in an emergency. For transformers the "normal" ratings were increased substantially, and an emergency rating was fixed based on the idea of using up 1% of the life of the transformer in any 24-hour emergency. Similarly, emergency ratings were determined for cables.

As a result of these considerations there is in many parts of the Newark system no "spare capacity" in the old sense of standing idle and waiting. With this background the problem of formulating some guiding standards for system planners was approached, the problem being complicated by the impossibility of a mathematical analysis. So the criterion was accepted that the present service was satisfactory, that it must not be allowed to deteriorate, but that large expenditures to improve it were not justified.

CRITERIA FOR THE PROVISION OF SPARE PLANT CAPACITY

Fundamental Assumption	1. Preparation must always be made for forced outage of any single piece of equipment or any line or pole line.
Distribution Circuits	2. If a feeder serves only two or three customers, it must be possible to restore one-half of any load dropped by outage of it within approximately three hours, and all of the load dropped within approximately 12 hours. 3. If a feeder serves numerous customers, it must be possible to restore essentially all of the load dropped by outage of it within approximately three hours.
Unit Type Substations	4. For loads above 2,000 kVA (one feeder) and up to 6,000 kVA (three feeders), interruptions must be limited to the period required for operation of automatic, service restoring apparatus, capable of restoring all of the load interrupted. This would be a matter of one or two minutes at the most. 5. For loads above 6,000 kVA (three feeders) full automatic duplicate service must be provided; no interruptions are acceptable. 6. Any arrangement must permit effective co-ordination of fuses, automatic disconnecting switches, automatic breakers and associated relays and controls. 7. Provision need not be made for faults on substation buses or on equivalent short-sections of line.
Extensive Repairs	8. If any facility may require more than one week for repairs, provision must be made for overlapping outage of any other facility.
Bulk Power	9. The total installed kilowatt capacity shall not be less than the peak kilowatt load adjusted for load diversity and increased by 15%.

Rules

The resulting rules are listed in the table, but some account of their derivation is of interest. After the fundamental assumption had been made, rules 2 and 3 were drawn up to define the unit of load to be dropped and the conditions under which such an outage would be tolerated. In connection with these rules it should be noted that most of this network's circuits are rated at 300 amps. A fully equipped spare feeder position is provided in all substations, connected to an outgoing "tie feeder."

Experience with unit-type substations is limited, and rules 4 to 7 have been made to guard against long interruptions of supply. Rule No. 7 takes financial limitations into account; in larger substations and all switching stations bus faults are provided for.

Rule 8 has many indirect effects. For instance, if a synchronous condenser is installed at a substation, no allowance is made for it in reckoning transformer capacity, since failure may keep it out of action for some weeks. Static capacitors, on the other hand, may be quickly repaired, and so they are "credited" in full.

Rule 9 is based on a U.S. Federal Power decision that the area in which Newark is included (installed capacity 4,587 MW) shall have a reserve capacity equal to 15% of the forecast load. In view of this Rule 9 supersedes Rule 8 when considering the network's 1,390 MW effective capacity, which includes two machines with an aggregate capacity of 240 MW.

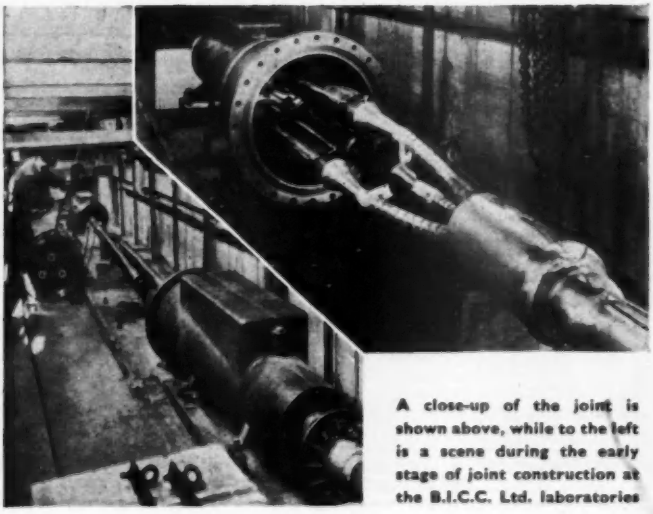
THREE CORE 66 kV BARRIER JOINT

AN important advance in cable joint design is marked by the production of the three-phase unit shown in the illustration. Used as a sectionalising joint on a 66 kV, 3-core 0·4 sq in. cable, it performs a duty which previously required a series of single-phase joints. B.I. Callenders Cables Ltd. have designed and manufactured the joint to subdivide pneumatically the i.p. cable installed on the 15-mile route between Battersea Power Station and the Southern Electricity Board distributing centre at North Hyde. Three cables are used for the link, which has a capacity of 150 MVA.

The insulating diaphragm of the joint, which is called upon to withstand constant gas pressure of 200 lb/sq in., consists of a metal plate with porcelain insulators—through which the conductors of the cable pass. The combined electrical and mechanical strength of porcelain insulators makes them highly suitable for this purpose, but the relatively large dimensions necessitated in the past has restricted their use to single-phase arrangements. The shell for the joint is made from a casting in which a special grade of bronze has been employed, and it is thus ensured that no porosity in the casting can exist. The cable cores are connected to a bared conductor which passes through the porcelain, and the insulation between them consists of insulated paper with a rosin-free compound. The earthed screen on the cable core is terminated in the conventional manner with a paper roll stress cone. The shell is filled with compound, and is provided with an air dome, an equilibrium of gas pressure being kept between this and the cable proper.

The assembled joint has an overall length of 11 ft with a maximum diameter of 27 in., and without compound or cables it weighs 19½ cwt.

Developed in the company's own research laboratories, the present design has been submitted to the full over-voltage tests required by the customer's specification. This, incidentally, was more severe than the current B.E.A. specification. The actual jointing, carried out by the B.I.C. Construction Co., required a total of 96 hours to complete, which is a considerable reduction in the jointing time required for a single-phase arrangement.

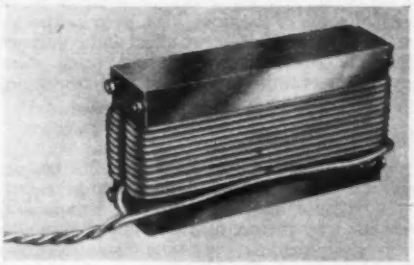


A close-up of the joint is shown above, while to the left is a scene during the early stage of joint construction at the B.I.C.C. Ltd. laboratories

ULTRASONIC GENERATION

New High-Power Unit Now Available

THE potentialities of ultrasonics in industry are far from being completely explored. At present, however, they can be used in the metallurgical field in the mixing of powdered and molten metals, and may also be used for speeding up the process of solidification in molten tin and aluminium, and for the tinning of aluminium and similar metals. Emulsification of a number of liquids and the precipitation or dispersion of particles in suspension are further possibilities. A certain amount of success has also been achieved in cleansing and washing applications, especially with cotton and rayon waste.



The general application of ultrasonics is, however, largely dependent on the power available, and it is therefore worthy of note that the Electronic Equipment Division of Mullard Electronic Products Ltd., has produced a new high powered low frequency Magnetostriction Generator. The ultrasonic energy available from the instrument appears to be limited only by the power that can be generated from the power amplifier.

General Features

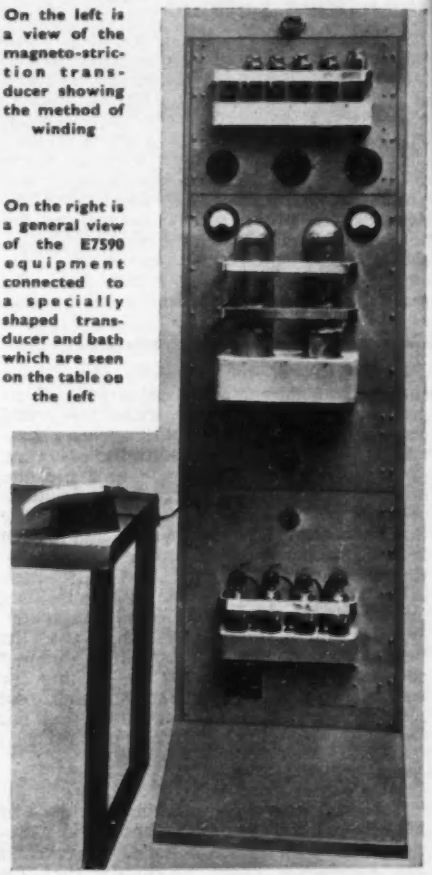
The standard generator consists of two parts —the main unit, comprising a driving oscillator, power amplifier and low voltage d.c. power supply, together with necessary monitoring and check meters; and the transducer unit composed of a stack of nickel laminations wound with a common coil for excitation and polarisation. A similar design to that used in p.a. amplifiers has been adopted for the power source for the transducer, and a maximum output of 1 kW over a frequency range of 10 kc/s to 25 kc/s is available.

The field of application of ultrasonics has been greatly broadened by the design used for the transducer. This consists of a stack of nickel laminations somewhat representing a transformer core and is insulated for immersion in conducting liquids. Alternately it can be clamped on the side of the treatment bath or can be made with a curved actuating face for special requirements. With suitable cooling arrangements the loading on the face is normally about 5 watts/sq. cm.

Generators

Rack-mounting has been adopted for the generator to provide ease of service and the simplified controls allow operation by semi-skilled labour. Continuous operation is possible at peak power over a frequency range of 10 kc/s to 25 kc/s but equipment working at other frequencies can be supplied.

Three equipments are at present available : the E7590A, 1 kW, weight 448 lb.; the E7590B, 500 watts, weight 432 lb.; and E7590C, 250 watts, weight 364 lb. All have the same dimensions—69-in high by 20½ in. wide by 23 in. deep, and all work from 200-250 volts a.c.



On the left is a view of the magneto-striction transducer showing the method of winding

On the right is a general view of the E7590 equipment connected to a specially shaped transducer and bath which are seen on the table on the left

E.R.A. REPORTS

Recent Issues for General Publication

FOUR new E.R.A. Reports have recently been made available for general circulation. These are "Rates of Rise of Restriking Voltage at Circuit Breakers on 66 kV Systems," by L. Gosland and D. G. White, price 4s. 6d.; "Gas Blast Circuit Breakers; Behaviour of Experimental Models at Reduced Pressures," by F. O. Mason, L. H. Orton and A. M. Cassie, price 6s.; "The Zeeman Effect in Astrophysical Spectra II. The Emission Spectra of Novae," by C. E. R. Bruce, price 6s.; and "Short Time Phenomena in the Iron Welding Arc: The Detailed Nature of the Arc Voltage and Its Significance" by L. H. Orton and J. C. Needham, price 15s.

Restriking Voltage

The first Report carries forward the work started by the E.R.A., on presenting calculated rates of rise of restriking voltage at practically all circuit breaker positions on a particular 66 kV system. In this case, the system (known as System A) consisted of two power stations connected together and also to an extensive distribution network. The assumptions and simplifications introduced are described in the Report although the specific calculations are not worked out in detail. The results, however, are tabulated and conclusions drawn. It is emphasised that this work is only part of a general survey of the problem in this country.

Gas Blast Circuit Breakers

In this Report, the behaviour of gas blast circuit breakers with variation of gas and air pressure is discussed both theoretically and practically. It is pointed out that when operating at pressures below the normal operating range, such circuit breakers have a pressure range in which apparently random variations of performance occur. The factors which cause this are dealt with at some length, and include local turbulence in the gas stream, and metallic vapour in the arc stream. The most likely cause of variation is believed to be something inherent in an arc under forced convection. Whether this is some factor which leaves the residual arc column at zero in a different condition from test to test or whether the variation resides in the breakdown mechanism after current zero has yet to be discovered, but this matter is still being actively pursued.

The Zeeman Effect

The third Report enlarges the work done by Mr. Bruce in his previous reports on astrophysical spectra and solar noise, and develops the suggestion made previously that the broadening of the lines in the spectra or nova may be accounted for by Zeeman effect, and not the Doppler effect which is usually regarded as the cause. To prove this, the breadth of the lines of some of the nova have been calculated on the basis of the Zeeman effect and compared with the observed widths and fairly close agreement obtained. Work is still continuing on the general theory.

Arc Voltage

An investigation into the voltage fluctuations of a d.c. arc as is used in steel welding is contained in the final Report. The voltage was measured by means of a cathode ray oscilloscope equipment having a time resolution down to 10^{-5} seconds. The recordings were taken on a time scale of 100 micro-sec/mm over a period of 0·3 seconds, and disclose a hitherto unsuspected "oscillatory form" superimposed on the arc voltage. This may be classified into three groups; low frequency (1 kc/s), intermediate (10 kc/s) and high (100 kc/s). Other differences are found in the arc voltage to be dependent on the type of electrode used and the material of the work. It is thought that the l.f. type of oscillation is associated with major changes in arc length, whilst the i.f. type is associated with a hot melting cathode, and is possibly accounted for either by a rapid limited movement of the arc root or column or by some cathode emission phenomena. The h.f. oscillation appears to be initiated in three ways—by the rupture of a short circuit; at a voltage discontinuity and sometimes as a smooth transition from the normal voltage. The h.f. periods are short and are generally found in the steel electrode type arc.

Oscillation Elimination

These oscillations can, however, be almost eliminated experimentally. Clean "block" type electrodes reduce the l.f. type, cathode cooling cures the i.f. type and the use of certain contaminants or coatings on the electrode surfaces can be used with success for curing the h.f. type.

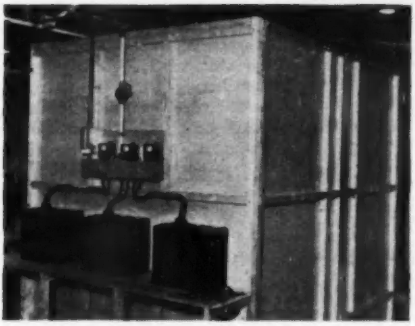
It is noted that a weld may easily be made with a rod which produces an arc voltage oscillogram free from h.f., while such a run is difficult with a rod which gives rise to bursts of, or considerable periods of, h.f. oscillation. Thus the use of correct coatings may considerably ease the difficulties of welding.

These Reports are available on application from the British Electrical and Allied Industries Research Association, Thorncroft Manor, Dorking Road, Leatherhead, Surrey.

ULTRA-VIOLET LIGHT

New Applications in Industry

APART from the well-known properties of ultra-violet light, such as the production of fluorescence and testing of colours for fading, there are many other uses to which this form of radiation can be put. It is not generally known, for example, that accelerated chemical reactions can be induced by ultra-violet light, and that this can be employed in commercial practice. One instance is in the manufacture of patent leather, which is often prepared by exposing a suitable liquid varnish on the leather to light from batteries of ultra-violet lamps which converts it into the familiar hard flexible surface. A valuable recent development used by Thermoplastics Ltd., and the I.C.I. Plastics Division, is the cold welding of "Perspex" acrylic sheet. The two surfaces are coated with a special cement, and after being brought into contact, are irradiated with ultra-violet. The resultant photo-chemical changes convert the joint into solid homogeneous material.



Exterior of an ultra-violet cabinet for polymerisation of "Perspex" at the De Havilland Aircraft Company's factory

Elimination of Static

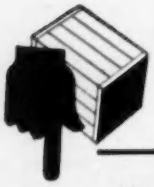
In many industries, where continuous process work is carried out, the product is likely in its passage through the machine to develop static charges. When this occurs in an atmosphere where inflammable vapours are present, extreme precautions have to be taken to preclude the possibility of a spark discharge leading to explosion and fire. An example of this is in the printing trade, where quick drying is sometimes aided by the use of rapidly evaporating spirits. Other trades where static charges can be built up are in cotton and rayon manufacture, winding celluloid film, and paper-making. As ultra-violet has the property of releasing electrons from matter, these charges can in suitable cases be dispersed by the use of ultra-violet rays.

Filling vials under aseptic conditions in a cabinet irradiated with u.v. light from a Hanovia lamp at Ciba Laboratories Ltd.

Sterilisation

It is frequently difficult or impossible to sterilise products by heat and, in many cases, chemical sterilisation would result in the taste of the product being objectionable. Such examples occur in the brewing and bottling industry, and in the purification of water, both for drinking and in places like swimming baths. In food factories also, the air can be kept comparatively germ-free by subjecting the air to ultra-violet radiation.

Finally two new uses are of interest. By developing a portable battery-operated ultra-violet lamp, Hanovia have produced a new tool for the geologist. Uranium salts, for example, are highly fluorescent. The lamp can also be used for identifying seepage. If a cesspool is suspected of seeping into a well, a little fluorescent liquid can be placed in the cesspool and examination of the well water under ultra-violet will show definitely if seepage is present.



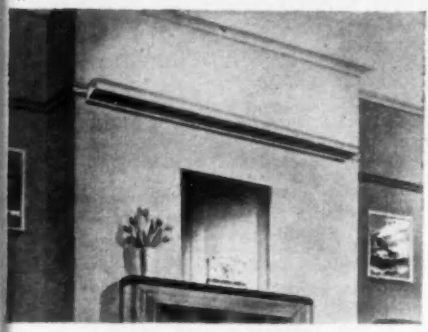
THE BUYER'S COLUMN

New Lamp Colour

NOW added to the range of fluorescent lamps produced by members of the Electric Lamp Manufacturers' Association is the "Mellow," suitable for use where a warm colour is desired. Conforming in all respects except colour to the other fluorescent tubes, the new type costs 19s. 6d. for the 5 ft 80 W size, including purchase tax, or 20s. 9d. for use with instant start gear.

Domestic Fluorescent

SILENT operation is a necessary quality of any domestic lighting installation, and in a drawing-room, for example, even the slight noise associated with some fluorescent lamp ballast chokes



The new Atlas fitting in place

may be objectionable. The Atlas cornice lighting unit shown in our illustration and manufactured by Thorn Electrical Industries Ltd., 105 Judd Street, W.C.1, eliminates the possibility of disagreeable hum by making use of a resistive ballast. The same expedient reduces the cost of the lamp, though it increases the current consumption. Complete with control gear and 4 ft 40 W lamp, the unit which can be hooked to a picture rail, costs only £3 8s. 3d., including purchase tax. A "Portland Stone" finish is provided, with white stove enamel on reflecting surfaces.

Insulation Tester Modified

MEASURING resistances up to 50 MΩ, the "Major" ohmmeter manufactured by the Record Electrical Co., Ltd., Broadheath, Altrincham, incorporates many of the features of the firm's well known "Minor" instrument, but differs from it in having a constant voltage generator. Standard models apply a 500 V, constancy being secured by the use of a slipping clutch.

Continuity testing is possible with the meter, which has a second scale reading 2Ω at the centre. For this purpose the testing voltage, still obtained from the generator, is reduced to about 2 V. The "Major" tester, which measures only 7½ in. by 4 in. by 4 in., is described more fully in the company's leaflet D/b.

Wave Guides Standardised

A RECENT addition to the technical publications issued by Johnson, Matthey and Co., Ltd., 73 Hatton Garden, London E.C.1, is a new data sheet describing the properties and availability of their precision drawn waveguide tubing.

It gives full details of the dimensions and tolerances to which rectangular and round guide are produced in a standard range which has been designed to cover existing service specifications and to make available an adequate selection to commercial organisations.

High Frequency Sound for Soldering

SOLDERING aluminium and most other light metals is made difficult by the tendency they have to form a tough oxide film on any cleaned surface. Engineers of Mullard Electronic Products Ltd., Century House, Shaftesbury Avenue, London W.C.2, have now produced a soldering machine which overcomes this difficulty by stimulating work surface at ultrasonic frequency, thus temporarily destroying the oxide film. An electrically heated copper bit is used, secured firmly to the nickel core of a magneto-striction transducer, which is powered from an oscillator. No fluxes are used, and ordinary soft solders may be employed, though to avoid electrolytic action it is advisable to keep to a tin-zinc base solder.

Successful Slip-Ring Moulding

IN our note under the above heading on December 15, we stated that the units illustrated were moulded from B.I. Plastics Ltd. chopped phenolic material. The material is actually produced by Bakelite Ltd. B.I. Plastics Ltd. do not make phenolic plastics.

TRADE PUBLICATIONS

FLAMEPROOF LAMP.—Leaflet No. 1350, issued by the Belmos Co. Ltd., Bellshill, Lanarkshire, describes the firm's type TW 60W flameproof lighting fitting. Units for 100/150 W are stated to be in course of development.

CONDUCTIVITY BRIDGE.—Recently produced by Muirhead and Co. Ltd., Beckenham, Kent, bulletin B-648-A describes a conductivity bridge built up from the company's range of "universal units."

THE WEEK IN NEWS

Move to Break Pipework Bottleneck

BECAUSE insufficient high-pressure pipework is available to meet B.E.A. requirements, the Central Authority have asked C. A. Parsons and Co., Ltd., to include it in their range of products. Agreeing to do this, the firm, who specialise in the manufacture of turbo-alternators and associated equipment, are now extending their plant at Newcastle.

A statement by B.E.A. says that the present shortage of high-pressure pipework is likely to continue for several years. The arrangement with C. A. Parsons and Co., Ltd., will prevent unnecessary delays in providing new extensions and new generating stations. The company will undertake fabrication, supply, and erection of all pipework and other equipment required to connect steam boilers to turbo-alternators including steam and water lines. Specifically to relieve the present bottleneck, the work will last for five or six years and employ about 500 men.

Placing of the work with a Tyneside firm will undoubtedly lessen fear of unemployment there. Production of the pipework is scheduled to begin in November, 1950, reaching full output by March 1951.

Recently it was announced that the firm of Aiton and Co., Derby, who also manufacture pipes for power stations, were to begin production on the site of the old Southwick shipyard at Sunderland.

Schoolboys Exhibition Emphasises Careers

MOST successful stand at the Schoolboys Own Exhibition, Horticultural Halls, Westminster, is that of British Railways. It is not surprising, for who can fail to be attracted by 500 ft of an O gauge working layout set in a realistic miniature landscape. Attractions in "Electricity Arcade" include gadgets for visitors to try out themselves and an electronic watch tester which records accuracy of watches within one-tenth of a second. Main emphasis of the exhibition is placed on careers.

Advertising Council Supports Exporters

SET up at the request of the Dollar Exports Board, the Advertising Advisory Council now announces the services to be available to British exporters to the United States. The Council comprises representatives of British and American advertising agencies with the object of assisting British exporters. This is done by supporting D.E.B. trade speakers, surveying American markets, and advising D.E.B. on advertising.

Exporters' inquiries are answered directly by the Council's secretary. Questions which cannot be answered immediately are referred to individual Council members, selected by rotation. The member obtains information from the American office and submits a report, free of charge, to the inquirer. If the report indicates possibility of a good market, further survey may be carried out and the manufacturer assisted in establishing an American sales organisation. The Council's responsibility ends when a U.S. advertising agency takes over. Temporary offices of A.A.C. are at 40 Berkeley Square, W.1, and David W. James is Acting secretary.

At the Hollinwood works of Ferranti Ltd., Sir Vincent de Ferranti recently presented 62 long-service employees with certificates and gold watches. Length of service ranged from 40 to 51 years

British Firm Win Tasmanian Contract

MANCHESTER engineering firm of Robinson and Kershaw have secured a contract to supply 300 electric transmission line towers for a new Tasmanian H.E. scheme, in spite of fierce Australian competition.

The First Half Century

The informal discussion held by the Northern Society of Electrical Engineers is particularly interesting in that it tends to rehabilitate the discredited single-phase distribution (for trams) and attacks in an uncompromising way the polyphase system so lately hailed by our President as the rising sun before which all other methods of distribution were doomed to pale their ineffectual fires. Seeing the Glasgow tramway system was held up as an awful example, it is to be regretted that Mr. Parshall was not present to give the other side. Mr. Ferranti's advocacy of single-phase distribution is intelligible, but his information respecting single-phase motors is in advance of that generally available if he can trust them to start on full load. Of course, the chief objection to polyphase motors for tramway work is the need for a double trolley wire.—*From our issue of January* 4, 1900.

Resumption of floodlighting in L.C.C. parks means that Youth Clubs can now play off evening fixtures. Picture shows football match on Eel Brook Common

I.E.E. Christmas Lectures

CHILDREN attending the annual I.E.E. Christmas lectures at the Institution on Tuesday and Wednesday afternoons were themselves televised, for the subject of this year's lecture was "Television." An impressive array of T.V. equipment was on show, and in thorough detail, Mr. H. L. Kirke, head of the B.B.C. T.V. research department, explained some of its "mysteries".

Overseas Economic Surveys

THE two latest overseas economic surveys published by the Board of Trade deal with Portuguese West Africa and Mexico. Regarding the first named, it is shown that imports of generators, transformers, motors, etc., from the U.K. during 1947 amounted to 5,440 contos, while the U.S.A. supplied similar goods to the value of 3,696 contos. Imports of radio sets in the same year amounted to 2,029 contos from the U.S.A. and 797 contos from the U.K. Angola is, of course, mainly dependent on its agriculture, diamond and fishery industries, but efforts are now being made on the manufacturing side. As part of a development plan, the Mabubas hydro-electric scheme has been prepared, and surveys are being made to utilise the River Catumbela in the neighbourhood of Lobito.

The report on Mexico shows that the electrical industry is strongly held by U.S.A. concerns, as might be expected, although the change in the sterling rate may present opportunities for British manufacturers of heavy plant.

New European Broadcasting Union

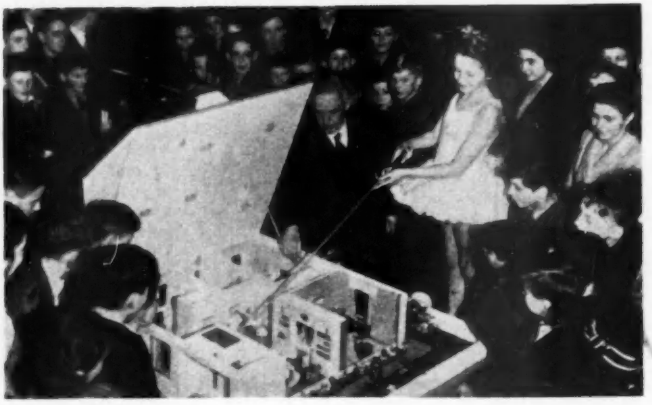
WITH the object of achieving unity of broadcasting in the European Zone, the B.B.C. have been asked to convene a conference on February 6. All broadcasting organisations belonging to countries which are members of the International Telecommunications Union are to be invited. The conference was proposed by a preparatory committee consisting of European broadcasting organisation representatives which held meetings in Paris just before Christmas. Draft statutes for a new union have been prepared by the committee, which hopes to obtain the greatest possible co-ordination of frequencies.

Lecturer "Shocked" His Audience

NOVEL demonstrations of the use of electricity enlivened the first of a series of lectures by Dr. P. Dunsheath at the Royal Institution in London on Thursday. Subject of the course, the 120th given by the Institution, is "The Electric Current," and the lectures were specially arranged for a "juvenile auditory."

Speaking in front of a tableful of electrical apparatus, Dr. Dunsheath sketched discoveries about electricity and, with the help of a small girl in ballet dress, identified electrical equipment in the home. Demonstrations included heating of mince pies by high-frequency rays (the samples being eaten by the audience) and the use of an electric cell to guard apples. Children were invited to try and take one without ringing a bell. Surprised volunteers jumped when Dr. Dunsheath joined hands with four lads to illustrate an electrical current.

The second and third lectures were held on Saturday and Tuesday. Further lectures are to be held at 3 p.m. this afternoon (Thursday), and on Saturday and next Tuesday at the Royal Institution.

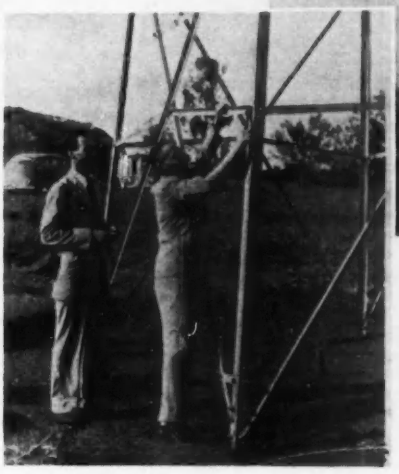


Dr. Dunsheath indicates the many uses of electricity in the modern home to his juvenile audience

Power for Owen Falls

AS one of the first stages in the Owen Falls hydro-electric scheme, construction has started on the 66 kV single circuit o.h. transmission line between the site of the station at Jinja and the recently constructed Kampala "B" power station. Our pictures show the first tower erected and Mr. C. R. Westlake, chairman of the Uganda Electricity Board, tightening the last bolt on that tower. This line is to operate, initially, at 33 kV, supplying power from Kampala to assist in the constructional work of the dam. Eventually, it will operate at 66 kV, carrying power in the reverse direction. The line will be the first of the two circuits to serve this latter purpose.

Constructed on steel towers 55 ft 6 in. above ground, the line is some 44 miles long, involving the use of 236 supports. The route follows the new Kampala-Jinja road alignment for a distance of about 14 miles, after which several deviations were necessary. The line is being constructed by British Insulated Callenders' Construction Co., Ltd. Consulting engineers to the Board are Kennedy and Donkin.



The first tower for the 66 kV line from Jinja to Kampala. Left, Mr. C. R. Westlake tightening the last bolt, accompanied by Mr. J. C. Lithgow, resident partner of Kennedy and Donkin in East Africa

B.E.A.M.A. Publish Short History

NEWCOMERS to the electrical industry will find B.E.A.M.A. publication No. 141 of considerable interest, for it contains a short account of the growth and activities of the Association. Fourteen pages of text outline the formation of B.E.A.M.A. present-day organisation, the thirty manufacturing sections and the important work carried out at home and overseas. Copies are obtainable from British Electrical and Allied Manufacturers Association, 36 and 38 Kingsway, W.C.2.

Fifty Years of Fine Standards

ALTHOUGH the National Physical Laboratory celebrated the jubilee of its foundation on Sunday, the occasion will not be accorded official recognition until the summer of 1951. Lord President of the Council, Mr. Herbert Morrison, the Minister responsible for the Department of Scientific and Industrial Research, has directed that the golden jubilee celebrations shall be part of the Festival of Britain.

Founded in 1900, for fifty years the laboratory has been concerned with standards of measurement and research into methods of measurement. Today the laboratory also supplies the various Ministries with expert knowledge on national standards. It comprises ten major divisions pursuing researches into specific fields of inquiry, with a separate section for electronics. The new director of the laboratory, Professor F. C. Bulleid, took up his appointment on New Year's Day.

Re-styled Goods Will Sell

PROVIDED they are remodelled to conform with United States styling methods, British refrigerators could become a ready seller in U.S.A., is the opinion of a concensus of American Trade, reported by Reuter. Re-styled goods would have to be offered at competitive prices, because many American goods are now in ready supply.

As reported in our issue of December 8, one British firm, Astral Equipment Ltd., has already opened a plant at Rockleigh, to manufacture baby refrigerators exclusively for American consumers.

Scope for selling electric houseware in the U.S. is enormous. Last year retail sales of table appliances netted something like 613 million dollars. Forecasters predict a large expansion in the near future. But sales campaigns should not be directed primarily at rural areas where farmers' incomes are tumbling faster than others. Hydro-electric equipment sales in the U.S. will almost certainly be affected by prolonged drought conditions, particularly in the east.

Armature of a B.T.H. motor on its way to the Steel Company of Wales

Nightwork Spreads the Load

RATHER than impair the production drive of one of our best selling exports, bicycles, 300 Raleigh employees at Nottingham have volunteered to work at night. The transfer from day work will help spread the electricity load.

An official of the company explained that the firm could not maintain its increasing production during peak periods of the electricity load and, at the same time, establish the saving in electricity consumption required by the Electricity Board. Employees in a number of departments met the situation by agreeing to go on night shift during the period of the restrictions.

Electric Drive for Rolling Mills

SHOWN above on its way to the Steel Company of Wales is the armature of a B.T.H. 4,500/10,800 h.p. d.c. motor. The order which B.T.H. has in hand for the firm includes two motors of this rating (4,500/10,800 h.p., 125/282 r.p.m.), and one rated at 4,000/9,600 h.p., 132/296 r.p.m., intended for the drive for the 80-in. hot strip finishing mill. Manufacture of three further motors for the same mill (each rated 3,000/12,000 h.p.) is well advanced, while the 21,000 kW rectifier equipment, comprising thirty pumpless steel tank rectifiers, has already been dispatched.

Houses into Flats

LEGISLATION in the Housing Act, 1949, to allow local authorities to advance money for the conversion of property into new flats has led to the publication of a new E.D.A. booklet. Profusely illustrated, "Electricity Turns Old Houses into New Flats" accentuates the simplicity and adaptability of electricity in planning conversions.

Eight sections in the booklet deal with the main services that electricity can provide. The whole publication is compiled with the object of giving owners of large properties ideas for conversion. Architects, builders and local surveyors are not forgotten, for helpful diagrams show typical examples of electrical planning.

NEWS IN BRIEF

Col. G. C. Mallinson is to preside at Northern Counties area, E.I.B.A., annual general meeting at 3 p.m. on Thursday, January 19, in the Lecture Theatre (lower ground floor), Curtiol House, Newcastle-upon-Tyne.

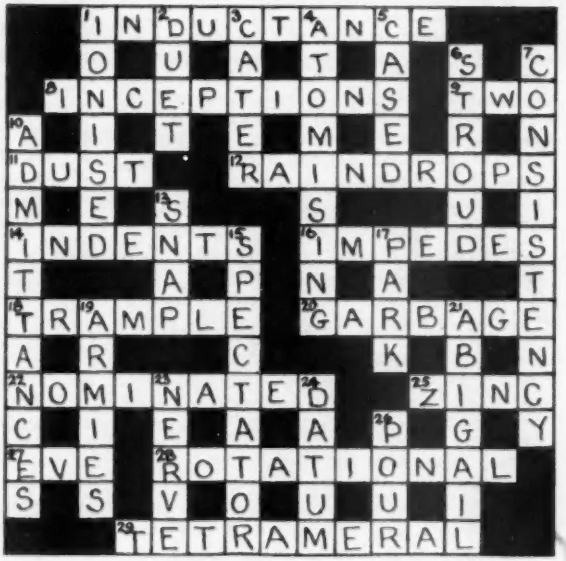
Modern New Zealand house with self-contained laundry and all-electric kitchen has arrived in London for the "Ideal Home" exhibition opening on March 7.

Applications for tickets for I.E.E. South Midland centre annual dinner, at Grand Hotel, Birmingham, on February 3, must be made before January 20. Assistant honorary secretary is R. H. Phillips, 125 Moor Street, Birmingham 4.

Annual dinner of Bournemouth E.C.A. branch attended by 175 guests was followed by dancing. Secretary of the branch, which has 40 members, is Mr. C. Oxford, Aish's, Yelverton Road, Bournemouth.

First correct solution opened in our December 22 crossword competition was submitted by M. Horsfield, Esq., 46 Westville Road, Thames Ditton, Surrey. A cheque for one guinea is being sent.

SOLUTION TO THE "ELECTRICAL CROSSWORD"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A R C K B N
22 N O M I 23 N A T E 24 D 25 Z I N C
C I E A A 26 P G Y
27 E V E 28 R O T A T I O N A L
S S V O U U I
29 T E T R A M E R A L

ELECTRIC SUPPLY NEWS

Crewe

The Ministry of Health has approved an application by the Town Council for consent to the borrowing of £4,850 for the provision of electric cookers in 248 post-war houses on the Middlewich Street Estate (220 Easiform houses) and Davenport Avenue (14 houses).

East Midlands

The East Midlands Electricity Board has now given indication that it, too, has agreed with the proposal to adopt a block tariff structure in the new standardised tariff to be put into operation at some future date. This was revealed at the meeting of the Area Consultative Council last week, when a report from Mr. C. R. King, Area Board chairman, was considered. In this it was stated that the Board's proposed new domestic tariff would consist of an initial block of units assessed on the number of rooms, and all additional units consumed would be charged at a low unit price. No decision had yet been reached regarding the size or the unit charge of the initial block of units, or the low unit price. The committee approved the introduction of a simple two-step block tariff. The Board is also to be asked to draw the attention of consumers to the possibility of dangerous wiring installed by amateurs or unqualified persons.

Middlesbrough

The Town Council has deferred consideration of proposed amended terms by the North Eastern Electricity Board for the supply and installation of electric cookers in new houses. At present, the cookers are charged at the cost price of £22 19s., the labour charge being 5s. 6d., making a total of £23 4s. 6d. The Board's new plan is to charge the cookers at the list price of £29 5s. less 15% discount, making a net cost of £24 17s. 3d. The labour charge would be on a time and materials basis amounting to £4 1s. 9d., making a total cost to the Corporation of £28 19s. The deputy borough engineer has informed the Council that he could not reconcile the proposed time and materials cost as in the construction of new houses provision was already made for the necessary conduit and, in some cases, the wiring had to be installed by the Board as part of their wiring contract. In deferring the matter, the Council has decided to ascertain on what terms cooker manufacturers would supply direct to the Corporation. The Board is to be asked how the wiring for cookers would affect the cost of the general wiring for new houses.

N. of Scotland

The little Loch Lomondside village of Luss was connected to the mains of the North of Scotland Hydro-Electric Board a few days ago, the switching-on ceremony being performed by Lady Colquhoun of Luss. To coincide, the Board held a two-day exhibition of electrical appliances in the village hall. Some forty houses in the village now take a supply, the remainder, which have been wired, will be connected up early in 1950.

South Western

Before the middle of next year the South-Western Electricity Board hopes to start work on schemes to take electricity supplies to more than 6,000 premises, including 1,000 farms, in its rural areas. Of this figure, 2,957 of the premises are in Somerset, 1,624 in Devon, and 1,789 in Cornwall. Of the total, it is hoped to connect 531 farms in Somerset, 156 in Devon and 265 in Cornwall.

The Board hopes that these plans will not be effected by the recently announced capital expenditure cuts. A broad outline of the schemes was given to the area Consultative Council at its meeting recently.

Sunderland

The Town Council has decided that all the electrical requirements of the corporation shall be carried out by the borough engineer's dept.

LIGHTING SCHEMES

Baildon.—The U.D.C. is to prepare schemes for the erection of mercury vapour street lighting.

Bolton.—The corporation proposes to spend £11,850 on street lighting improvements in 1950.

East Kilbride.—Members of the Development Corporation and officials of Lanarkshire County Council Lighting Department, have inspected new types of street and road lighting at East Kilbride. General agreement was reached in favour of one system, which will be put into operation subject to the approval of the Minister of Transport.

It is estimated that the lighting services for the new town may involve expenditure of £200,000, spread over a period. All cables will be laid underground.

Llandudno.—The U.D.C.'s engineer is to confer with the Merseyside and North Wales Electricity Board regarding the preparation of an illuminations scheme.

Luton.—It is proposed to install 90 additional street lighting units on the Farley Hill estate, at an estimated cost of £2,250. A sum of £5,300 is to be included in the estimates for 1950/51 for replacing gas lamps in Stockingstone Road, Montrose Avenue and Waller Avenue, with sodium lighting units.

Neath.—A scheme for the lighting of trunk roads in the borough is to be submitted to the M.o.T. for approval. It provides for the erection of 99 sodium and 48 fluorescent lamps, at an estimated cost of £9,600.

Walsall.—The Council has confirmed a recommendation that part of Upper Bridge Street, Ablewell Street and Springhill Road should be relighted with 20 ft standards, at an estimated cost of £2,000.

COMPANY ACTIVITIES

English Electric Co.

A financing programme is under consideration, which includes an issue of debenture stock and a small rights offer of Ordinary shares to Ordinary stockholders. This, it is stated, will make it necessary to increase the authorised capital, and in view of the company's expanding business, the opportunity is being taken to obtain authority from the Ordinary stockholders for a total Ordinary share capital substantially in excess of what is now required for the issue contemplated. It is proposed to increase the authorised capital to £8 millions, by creating 1,500,000 Ordinary £1 shares. A meeting is being called for January 16.

General Cable Manfg. Co.

For the year ended September, net profit was £83,480 (*£87,424*) before allowing £45,500 (*£41,300*) for tax. Net trading profit was £97,604 (*£103,352*). To depreciation of fixed assets £9,908 (*£10,953*), directors' emoluments £4,644 (*£5,813*), audit fee £262 (*£263*), costs in connection with issue of shares £68 (*nil*). With £15,413 (*£14,924*) brought in, and deferred repairs not required £954 (*nil*), there is £99,847 (*£104,472*) available. Allowing for taxation, £15,000 (*£20,000*) to general reserve, Preference dividend £2,475 (*same*), interim Ordinary dividend on £75,000 capital, 20%, £8,250 (*same*), and final 18% on £125,000 capital, £12,375, there is £16,247 carried forward.

Hoover Ltd.

The directors have called meetings for January 11 to consider a special resolution which involves a reduction in the rights of the "A" Ordinary shareholders in the event of a winding-up. The chairman emphasises that no proposal to wind up the company has been made or is under consideration.

Kalgoorlie Electric P. and L. Corp.

Arrangements have been made with the Beaver Trust Ltd. for the underwriting of an issue of £250,000 5% Convertible Redeemable Debenture stock, to finance a major plant extension programme. The stock is being offered to shareholders at par.

Melbourne and Metropolitan Tram. Bd.

For the year to June 30, total revenue was £4,052,861 (*£3,856,553*), less operating expenses and fixed charges £4,171,081 (*£3,726,057*), leaving debit of £118,220 (*credit £131,955 with £1,459 for previous year*). Appropriations take £335,810 (*£563,863*) increasing the adverse balance to £454,060 (*debit £431,908*), and reducing it to £76,720 (*£17,005*), with investment income, etc., of £377,340 (*£414,903*). After payments to consolidated revenue £150,270 (*£137,424*), deficit for the year is £226,990 (*deficit £154,429*) which is met by a transfer from general reserve.

Multitone Electric Co.

Trading profit for year to May 31 last was £8,941 (*trading loss £55,324*), plus profit on sales of vehicles, etc., £922 (*£3,469*), premium on assignment of lease £9,434 (*£2,304*), making credit balance £19,297. To directors' fees £350 (*same*), salaries £3,500 (*same*), audit fee £236 (*same*), bank charges £1,762 (*£2,717*), bad debts £2,715 (*£5,578*), off fixed assets £882 (*£1,824*), leaving a net profit of £9,852 (*loss £63,756*). Crediting £1,750 excess taxation, the debit balance carried forward is £56,809.

Radio Rentals Ltd.

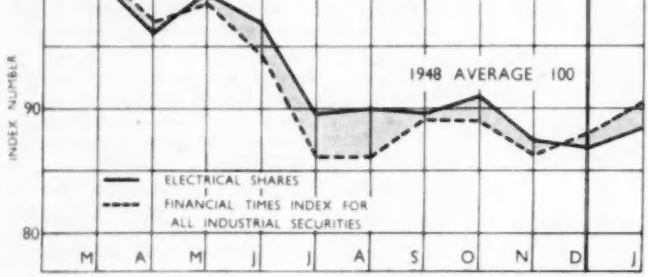
It is proposed shortly to issue 100,000 Ordinary 5s. shares at 10s. each. Ordinary shareholders will have the right to subscribe on a one-for-six basis.

Preliminary results for the year to August 31 show a net profit after tax, of £138,654 (*£89,244*). Final Ordinary dividend is 15%, making 25% (*same*). Group net profit was £150,162 (*£113,150*), but it must be remembered that the 1947-48 accounts covered periods in excess of a year for some companies in the group.

Dividends Declared

Telephone Rentals.—Interim dividend of 4% (*same*), payable on January 25.

Waygood-Otis Ltd.—Interim dividend of 20% (*same*).



Calculated from the quoted price of the Ordinary shares of nineteen electrical companies at the beginning of the month, as explained by Meteor on page 1, the "Electrical Times" share price index for January stands at 88.7% of the 1948 average, while the "Financial Times" index for all industrial ordinary shares, corrected to the same basis, stands at 90.4%. Both the indices show rises during December of about 2.5%, thus reversing for the time being the general falling trend that has existed since the end of 1948

Commercial Information

CONTRACTS OPEN

*The date stated is the last day for receiving tenders. Details of items marked * may be obtained on application to Room 1076, Board of Trade, Thames House, North Millbank, London S.W.1, quoting reference number.*

January 6.—Belfast T.C.—Supply following stores: (5) carbon brushes; (10) 6,600 V compound filled armourclad switchgear; (12) electricity maximum demand indicators; (13) automatic time switches; (14) l.t. fuse units, service cut-outs and accessories; (15) static transformers; (16) vulcanised bitumen and paper insulated cables and joint boxes; (21) electric cookers; (23) street lighting fittings, steel and concrete poles, and ancillary equipment; (25) overhead line materials; (26) mineral insulated copper covered cables; (27) electrical accessories and tinned weak back ferrules; (29) rubber insulated cables and flexible cords; (30) lamps. Forms Nos. 29 and 30 are in respect of materials which shall be supplied to any department of the Corporation. City electrical engineer and general manager, East Bridge Street, Belfast.

January 7.—Ashton-in-Makerfield U.D.C.—Installation of electric wiring in 50 houses at Bryn station site. Surveyor, Town Hall, Ashton-in-Makerfield.

January 7.—Dagenham T.C.—Electric lamps and supplies. Borough engineer, Civic Centre, Dagenham.

January 7.—Dalkeith T.C.—Sodium discharge street-lighting on trunk road A68 between the Fountain and entrance to Pease flat. Burgh Surveyor, Municipal Buildings, Dalkeith.

January 7.—N. Scotland H.E. Bd.—33 kV, 11 kV and lower voltage wood pole o.h. lines between Loch Awe and Oban. Merz and McLellan, 39 Northumberland Street, Edinburgh. Deposit £2 2s. Advertised in December 8 issue.

January 9.—Camberwell T.C.—Supply of electric lamps for 1950-51. John Clapp, borough engineer and surveyor, Town Hall, Camberwell, S.E.5.

January 9.—Durham C.C.—Supply and delivery of 38 steel electric lighting columns to Birtley by-pass. County engineer and surveyor, 43 Old Elvet, Durham.

January 9.—Elgin.—Electrical work for six houses at Newmill for Moray War Veterans' Homes Committee. R. M'Gill Homes Committee, County Buildings, Elgin.

January 9.—Standish-with-Langtree U.D.C.—Installation of 131 concrete lighting standards with control gear, 400-W mercury vapour discharge lanterns at Winchester to Preston trunk road, A.49. E. J. Brooks, engineer and surveyor, Ashfield House, Standish. Deposit £2 2s.

January 9.—Thailand.—(1) 7 Electric Alternating Generators, 100 volts, 500 watts, 50 cycles single phase. (2) 3 Electric Alternating Generators, 100 volts, 1,500 watts, 50 cycles single phase.

January 10.—Argentina.—Supply and erection of switchboards for San Juan thermo-electric power station. Directorate General of Water and Electrical Power. B.o.T. (Ref. CRE (IB) 36764/49)*

January 12.—Airdrie T.C.—Re-wiring and modification of electrical installation at Sir John Wilson town hall. Town Clerk, Jas. Taylor, 51 Wellwynd, Airdrie.

January 12.—Belfast.—Supply and installation of electrically-operated bed passenger lift at White Abbey hospital for N. Ireland Tuberculosis Authority, W. Harvey, Secretary, 27 Adelaide Street, Belfast.

January 12.—Cheadle and Gatley U.D.C.—Supply and erection of an electric petrol pump single phase, 230 V a.c. G. P. Stanley, engineer and surveyor, Town Hall, Bruntwood, Cheadle, Cheshire.

January 12.—Gillingham T.C.—Electrical installation at three-storey block of 18 flats at Featherby Road, Eastcourt Lane estate. Borough engineer and surveyor, Municipal Buildings, Gillingham. Deposit £2 2s.

January 12.—Northern Ireland.—Supply and delivery of electric lamps and electrical supplies at Government establishments during period ending January 31, 1951, for Ministry of Finance. The Ministry (Room 103), Law Courts Building, May Street, Belfast.

January 14.—Halifax T.C.—Installation of vehicle-actuated traffic control signals at Cow Street-Gibbet Street junction. G. Holden, borough engineer, Crossley Street, Halifax. Deposit £2 2s.

January 16.—Romford T.C.—Provision and erection of 80 street lighting units on (a) Gobions estate, part 1; (b) Heaton Avenue; (c) Highfield Road; (d) Hill Rise Road. Borough engineer and surveyor, Town Hall, Romford. Deposit £2 2s.

January 16.—Southport T.C.—Installation of floodlighting in (a) seaward side of Rotten Row; (b) South Marine Gardens. Installation of "fairy" lighting on trees on west side of Lord Street. Corporation's lighting engineer, 21 Eastbank Street, Southport.

January 16.—Uruguay.—Six X-ray generators and examination tables, lamps and tubes, serographic and tomographic appliances. Ministerio de Salud Publica, Division Administracion Seccion, Adquisiciones, 3 er. Pizo, Montevideo. B.o.T. (CRE (IB) 36729/49).*

January 16.—Uruguay.—Supply of automatic telephone exchange (step-by-step) capacity 700 lines; equipped 400 lines and 500 telephones. Usinas Electricas y Telefonos del Estado, Montevideo. B.o.T. (Ref. CRE (IB) 36780/49)*

January 18.—Wandsworth T.C.—Electrical works to commence April 1. R. H. Jerman, Town Clerk, Municipal Buildings, Wandsworth S.W.18.

January 23.—Uruguay.—300 metres of 220 V armoured cable, 3×16 mm 2. Administracion Nacional de Combustibles, Alcohol y Portland. B.o.T. (Ref. CRE (IB) 37760/49).*

Due to limitation of space, Overseas Contracts are only published twice in the above section. A complete list is available for reference at our offices

CONTRACTS CLOSED

B.E.A.—Contracts placed for power station, switching and transforming station and transmission equipment in the last month amount to £3,208,385. Principal contracts include: Bankside generating station: 11 kV switchgear, A. Reyrolle and Co., Ltd., 22 kV switchgear, Ferguson Pailin Ltd.; Brunswick Wharf generating station: Ash disposal plant, International Combustion, Ltd.; Deptford East generating station: Foundations for turbine and switch houses, Mitchell Construction Co., and Power transformers, Ferranti, Ltd.; Croydon "B" generating station: Station lighting and heating, Troughton and Young, Ltd.; North Tees generating station: Pipework equipment, Babcock and Wilcox, Ltd.; Skelton Grange generating station, Leeds: Turbine house frame and roof, Holst and Co., Ltd.; Chadderton generating station: Site clearance, M. J. Gleeson, Ltd., and Structural steelwork, Edward Wood and Co., Ltd.; Crimpsall generating station, Doncaster: Four 180K lb/hr boilers, Mitchell Engineering Ltd.; Barking "C" generating station 9·0 MVA 132 kV Reactors, Metropolitan-Vickers Electrical Co., Ltd.; Rayleigh substation, Essex: 33 kV 750 MVA switchgear, A. Reyrolle and Co., Ltd.

Belfast T.C.—Supply of 30,000 kW turbo-alternator, condensing plant, circulating water pumps and auxiliary apparatus, METROPOLITAN VICKERS ELECTRICAL CO., LTD., £344,357 (recommended).

Bradford T.C.—Installation of electricity in 118 houses on Buttershaw estate, T. D. LONG, £3,972 (recommended).

Hebburn-on-Tyne U.D.C.—Electrical work in 38 new houses, TANJON (NEWCASTLE) LTD., £1,715 14s.

PRICES OF CABLE MATERIALS
(at Tuesday night)

COPPER, electrolytic	£153	0	0
LEAD, good soft pig (foreign) ...	97	0	0
,, ,, "English" quality ...	98	10	0
TIN (99·99·75) ... (Cash) ...	£600½	—	£601
,, (3 months)	£578½	—	£578¾
ALUMINIUM, commercial purity (del.)	112	0	0
ARMOURING:			
Galv. Steel Wire (0.104 in.)	39	10	0
Mild Steel Tape (0.04 in.)	26	0	0
Note. Figures quoted are M.o.S. spot prices. For future prices the following premiums must be added:—			
For Copper delivered in 2nd or 3rd month after order (per ton) ...	2	10	0
For Copper delivered in 4th, 5th and 6th month after order (per ton) ...	5	0	0
For Lead delivered in 2nd or 3rd month after order (per ton) ...	2	0	0

GAZETTE ANNOUNCEMENTS

COMPANIES ACTS

Seagull and Brown, Ltd.—Mr. A. E. Attwood, 90 Queen Street, Cheapside, E.C.4, appointed liquidator at meeting on December 12.

BANKRUPTCY ACTS

Receiving Orders

Blackpool.—S. H. Lukey, 3 Mayor Avenue, Blackpool, lately in business as electrical engineer and photographic film manufacturer at Roseway Works, Rear 640, Lytham Road, Blackpool.

Dorchester.—A. Foulkes, 7 Great George Street, Weymouth, Dorset.

First Meetings

Ashton-under-Lyne and Stalybridge.—N. I. Ives, 145 Lodge Lane, Dukinfield, formerly in business as "Wagstaff and Williams," electrical contractors. First meeting, Official Receiver's office, 20 Byrom Street, Manchester 3, January 12, 11.30 a.m. Public examination, Town Hall, Ashton-under-Lyne, February 27, 2 p.m.

Stockport.—G. L. Milton, 49 South Avenue, Buxton, formerly in business as "Electro Radio" electrical contractors. First meeting, Official Receiver's office, 20 Byrom Street, Manchester 3, January 10, 11.30 a.m. Public examination, Court House, Vernon Street, Stockport, February 6, 2.30 p.m.

BUSINESS NOTICES

Changes of Address.—The CAXTON NAME PLATE MANUFACTURING CO., LTD., has moved to new premises, overlooking Kew Bridge, at Caxton House, 110 Kew Bridge, Richmond, Surrey. Telephone No. Richmond 0041.

The Birmingham lamp stores of the BRITISH THOMSON-HOUSTON CO., LTD., is now at Bolton Street, Bordesley. Telephone: Victoria 1162.

The ELECTRIC DISCHARGE LAMP AUXILIARIES COUNCIL has moved to 58 Victoria Street, S.W.1. Telephone: Victoria 0328.

The METROPOLITAN-VICKERS ELECTRICAL CO.'s office hitherto at Carlisle, including the Lamp and Lighting Department, is being transferred to Victoria Buildings, 38 South William Street, Workington (Telephone Workington 795), opening at the new address on January 9. The office will still be in the charge of Mr. J. Rogers.

New Phone No.—As from January 9, the telephone number of the London offices and showrooms of E. K. COLE LTD., and EKCO-ENSIGN ELECTRIC LTD., at 5 Vigo Street, W.1, will be Regent 7030/9.

Chloride Reorganisation.—The manufacturing and selling activities of the Chloride Electrical Storage Co., Ltd., have as from December 30, been transferred to a new subsidiary company, Chloride Batteries, Ltd., which has a capital of £1,500,000. This reorganisation, it is stated, is planned to improve the efficiency and general coordination of management of the activities of the Chloride Electrical Storage Co., both at home and abroad.

Raw Materials.—The Board of Trade announce that the work of the Mica, Rubber and Sundry Materials Directorates has now been amalgamated. The remaining functions of the present separate Directorates will be carried out from that date under the title of The Directorate of Sundry Materials. The address will continue to be Empire House, St. Martin's-le-Grand, London E.C.1. Telephone: Monarch 1020.

Representatives.—The ARORA CO. LTD. has appointed D. Whipp Ltd., 1a Lenton Avenue, The Park, Nottingham, as their representative in Leicestershire, Derbyshire, Nottinghamshire, Lincolnshire and Rutlandshire; and P. F. Preece, 2 All Saints Terrace, Bridgwater, Somerset, to cover South-West England and South Wales.

Zinc Price Up.—The Ministry of Supply has announced that as from December 30 the price of good ordinary brand zinc has been increased by £2 per ton to £87 10s. per ton. Zinc oxide is also increased by £1 15s. per ton, the new prices being: red seal, £84; green seal, £85 10s.; and white seal, £86 10s. per ton.

PROSPECTIVE BUSINESS

Antrim.—Construction of (a) 64 houses at Crumlin and (b) 20 houses at Randalstown, for N. Ireland Housing Trust. Trust Offices, 12 Donegall Square West (Top Floor), Belfast.

Australia.—Supply and erection of 1,000 prefabricated houses, for Housing Commission at Victoria. Secretary to Victorian Housing Commission, c/o Agent-General for Victoria, Victoria House, Melbourne Place, Strand, W.C.2.

Bacup T.C.—Erection of 14 houses at Huttock End site. Office of Borough Engineer, Municipal Offices, Bacup.

Baildon U.D.C.—Erection of 22 houses on Knoll estate. Architects, William Illingworth and Son, 15 Sunbridge Road, Bradford.

Bexhill T.C.—Erection of 4 three-storey blocks of flats and maisonettes of normal construction, at Ninfield Road. A. E. Geldard, borough engineer and surveyor, Town Hall, Bexhill.

Bolton T.C.—Erection of 29 two- and three-bedroomed houses and one-bedroomed flats on Leonard Street estate. Housing Director, Town Hall, Bolton.

Consett U.D.C.—Tenders are to be obtained for erection of 60 houses on Cutler's Hall estate. Architect, J. J. Eltringham, Derwent Street, Blackhill.

Cork C.C.—Erection of 220 cottages in 38 groups in various rural districts. Secretary, 7 Fr. Mathew Quay, Cork.

Durham C.C.—Plan for school clinic at Stanley. County Architect, Court Lane, Durham.

Durham C.C.—Conversion of The Hermitage, Whicklam, into old people's hostel. County architect, G. R. Clayton, Court Lane, Durham.

Herne Bay U.D.C.—Erection of 12 three-bedroom type houses in West Cliff area. A. S. Wilson and Partners, quantity surveyors, 8 Princes Street, Storey's Gate, Westminster, S.W.1.

Hitchin R.D.C.—Erection of 8 houses and 6 bungalows on Weston site. W. E. Potter, clerk, Council Offices, 21 Bancroft, Hitchin.

Kingsbridge R.D.C.—Erection of 12 houses at Aveton Gifford. Architect, C. Webber, Manor House, Kingsbridge.

Leicester T.C.—Flats costing £544,710 proposed for New Parks estate, to accommodate 372 families. City Architect.

Llanidloes T.C.—Erection of 24 houses at Llangurig Road. Messrs. T. Alwyn Lloyd and Gordon, Cardiff.

Loughborough.—New school proposed at Mountfields, for the accommodation of 150 primary children. Estimated cost £39,500.

Midhurst.—Erection of 3 pairs of three-bedroom houses at Edmont Road, for Midhurst Rural Housing Society, Ltd. Architect, T. Greenfield, "Newstead", Midhurst.

Middlesbrough T.C.—Erection of infants' department school meals block, caretaker's house, at Thorntree No. 1 county primary school. Director of Education, Education Offices, Woodlands Road, Middlesbrough.

Newcastle-on-Tyne T.C.—Plans for multi-storeyed flats for 4,000 families at Longbenton have been approved in principle by M.o.H. City architect, G. Kenyon, 18 Cloth Market, Newcastle.

Northumberland.—Education Committee has decided to install electricity at Acomb County Primary School at a cost of £175, to spend £160 supplying electrical equipment for stage at Amble County Modern School, and £890 to install electric lighting and power at Bedlington County Primary School.

Ross and Cromarty C.C.—All trades work for erection of 10 houses at Breasclete, Isle of Lewis. County Architect, Old Academy, Dingwall.

Ryde T.C.—Construction of houses at Salter's Road: (1) one pair type 9; (2) two pairs type 10; (3) two pairs type 11; (4) three pairs type 11a. Borough Surveyor, 5 Lind Street, Ryde.

Sheffield T.C.—Erection of 16 aged people's flats on Richmond estate, and 36 aged people's flats on Manor Park estate. W. Geo. Davies, city architect, Town Hall, Sheffield.

Southport T.C.—Erection of 18 three-bedroom type houses on Site No. 12, Grantham Road, Birkdale. Borough engineer, Town Hall, Southport.

South Shields T.C.—Supply of broadcast receiving apparatus and wiring for various schools. Director of Education, Town Hall, South Shields.

Stanley U.D.C.—Proposes to build 44 houses on east side of Durham Road. Surveyor, J. R. Heslop.

Wandsworth T.C.—Recommended to authorise B. E. to proceed with installation of traffic control signals, pedestrian railings and improvement works at junction of Putney High Street, Putney Bridge Road and Lower Richmond Road. Estimated cost, £10,082.

Woking U.D.C.—Erection of 56 houses on Maybury estate. H. P. Tame, engineer and surveyor, Council Offices, Woking.

YOUR QUERIES ANSWERED

"Invisaflex," flexible lighting fitting, makers of? T.E.—Electricity Services Ltd., 86 Cannon Street, London E.C.4. (17450)

"Don" pop-up toasters, makers of? T.R.M.—Seacliffe Engineering Co., Ltd., Highcliffe, Hants. (17454)

"Smithfrig" ice-cream making machines, makers of? A.T.—Smithfield Refrigerator Co., Ltd., High St., London N.8. (17459)

Static Convertors, single to three-phase, makers of? J.N.—Westinghouse Brake and Signal Co., Ltd., 82 York Way, King's Cross, London N.1. (17464)

"Beaver" electric radiators, makers of? T.N.—Renfrew Electric and Refrigerator Co., Ltd., Renfrew, Ontario, but we have no note of a British agent at the present time. (17467)

"Glasgow" ironclad switches, makers of? T.E.—Midland Electric Manufacturing Co., Ltd., M.E.M. Works, Reddings Lane, Birmingham 11. (17471)

The above are selected from the questions we have answered this week. If you have a query, send it to us.

ANSWER WANTED

"Fit-all" universal pencil type element, makers of? S.M. (17475)

COMPANY REGISTRATIONS

Extracted from the Register issued by Jordan and Sons, Ltd., 116 Chancery Lane, London W.C.2.

Gaish and Burge Ltd., 2 Bank Buildings, Cranleigh, Surrey. Electricians, radio and electrical engineers. Cap.: £1,500. Dirs.: E. H. Gaish, R. J. Burge and G. A. Smith.

D. Inman, Ltd., Nile St., Lancaster. To take over business of an electrical and radio wholesaler carried on at Nile St., Lancaster, by Dick Inman. Cap.: £10,000. Dirs.: D. Inman and Alma D. Inman.

C. E. Lane (Neon), Ltd., 485 London Rd., Westcliff-on-Sea. Manufacturers of and dealers in neon luminous tubes and electrical appliances, etc. Cap.: £100. Dirs.: C. E. Lane and Kathleen M. Lane.

Machine and Electrical Projects, Ltd., 39 Victoria St., S.W.1. Cap.: £500. Dirs.: G. S. Bell, P. R. O. Marden and J. Gillies.

TRADE MARK APPLICATIONS

This information is extracted from the Official Journal by permission of the Controller.

Cleanette, with design. B678,095. Class 7. Mixing, stirring, meat mincing, vegetable cutting and knife-sharpening machines, etc. H. Fisher (Oldham) Ltd., Glodwick Road, Oldham, Lancs.

Magnavolt. 667,968. Class 9. Electric automatic regulating apparatus. English Electric Co. Ltd., Queens House, Kingsway, London W.C.2.

Elliottronic. 677,875. Class 9. Electrical apparatus and instruments; scientific, nautical and surveying, mechanical indicating, signalling and measuring apparatus and instruments with recording parts. Elliott Brothers (London) Ltd., Century Works, Lewisham, London S.E.13.

Ekco Slimline. 673,780. Class 11. Ekco-Ensign Electric Ltd., Ekco Works, Southend-on-Sea.

MEETINGS TO NOTE

THURSDAY JANUARY 5

Instn. Electronics (Midlands branch).—Three-day Exhibition of Electronic Equipment. Exhibition Floor (5th), "B" block, Lewis's Ltd., Bull Street, Birmingham. —12 noon.

I.E.E. (Utilisation section).—"Some Problems in Aircraft Magneto Development." R. T. Coe and D. F. Welch. Savoy Place, W.C.2.—5.30 p.m.

I.E.S. (Exeter group).—"Church Lighting." L. C. Pettig. Agricultural House, Queen Street, Exeter.—7 p.m.

FRIDAY JANUARY 6

I.E.S. (Hudderfield group)—"Cold Cathode Lighting." E. A. Langsden. Electricity Showrooms, Market Street, Huddersfield.—7.15 p.m.

A.S.E.E. (Liverpool Branch).—"Rural Electrification." F. Ibbs. Liverpool Engineering Society, Dale Street, Liverpool.—7.30 p.m.

MONDAY, JANUARY 9

I.E.E. (N. Eastern centre).—"Some Aspects of Agricultural and Horticultural Electrification in N. America." F. E. Rowlands. Neville Hall, Westgate Road. Newcastle-upon-Tyne.—6.15 p.m.

I.E.E. (S. Midland supply and utilisation group).—"Polyphase Commutator Machines." B. Adkins and W. J. Gibbs. Imperial Hotel, Birmingham.—6 p.m.

TUESDAY, JANUARY 10

E.P.E.A. (London group).—"The Ventilation of Large Electrical Generators, with Special Reference to Hydrogen and other Methods of Cooling." D. F. Davidson. York Room, Caxton Hall, S.W.1.—7.15 p.m.

INSTN. MECH. ENGRS. (Automobile division).—"Electrical Equipment for Automobiles." W. Kendall. Storey's Gate, St. James's Park, S.W.1.—5.30 p.m.

INST. PLANT ENGRS. (East Lancs branch).—"Routine Inspection and Maintenance of Industrial Refrigeration Plant." Tech. representative, J. and E. Hall Ltd., Engineers Club, Albert Square, Manchester.—7.15 p.m.

I.E.E. (N. Western centre).—"The Performance of the British Grid System in Thunderstorms." J. S. Forrest, Engineers' Club, Albert Square, Manchester.—6.15 p.m.

I.E.E. (N. Midland centre).—"The Automatic Control of Lead-Acid-Battery Charging Equipment." R. A. Harvey. Lighting Service Bureau, 24 Aire Street, Leeds 1. —6.30 p.m.

I.E.E. (N. Ireland centre).—"Selection of Transformers for Use in Distribution Networks with a Special Reference to the New Low-Voltage Standard of 240 Volts." E. Tobin. Queen's University, Belfast.—6.45 p.m.

A.S.E.E. (S.W. London branch).—"Rectifiers" (illustrated). C. H. Brown. Compton Hall, Compton Road, Wimbledon, S.W.19.—8.15 p.m.

I.E.E.—"The Organisation of Laboratory Work." J. G. Fleming. Institution, Savoy Place, W.C.2.—6 p.m.

I.E.S. (London meeting).—"Discomfort Glare and the Lighting of Buildings." P. Petherbridge and R. G. Hopkinson. Lighting Service Bureau, 2 Savoy Hill, W.C.2.—6 p.m.

WEDNESDAY, JANUARY 11

E.P.E.A. (Merseyside technical group).—"The Protection of Electrical Networks and Plant." R. K. Edgley. Electricity showrooms, Whitechapel, Liverpool.—7 p.m.

NORTHAMPTON ELECTRICAL ASSCN.—"Space Heating." Unity Ltd.

I.E.E. (N. Lancs sub-centre).—"The Performance of the British Grid System in Thunderstorms." J. S. Forrest. Harris Institute, Corporation Street, Preston.

I.E.E. (Scottish centre).—"The Measurement of Light and Colour." G. T. Winch. Heriot-Watt College, Edinburgh.—7 p.m.

A.S.E.E. (Bradford branch).—"X-Ray and its Application." E. Hudson. Midland Hotel, Bradford.—7.30 p.m.

A.S.E.E. (Kent branch).—"Mineral Insulated Cable." Royal Star Hotel, Maidstone.—7.30 p.m.

THURSDAY, JANUARY 12

INST. HEATING AND VENTILATING ENGRS. (Birmingham branch).—"Electrical Systems of Temperature Control." T. Jackman. Imperial Hotel, Birmingham.—6.30 p.m.

I.E.E. (Radio section).—"Radar Echoes from Precipitation." J. E. N. Hooper and A. A. Kippax. Institution Building, Savoy Place, W.C.2.—5.30 p.m.

I.E.E. (N.E. Scotland sub-centre).—"The Measurement of Light and Colour." G. T. Winch. Royal Hotel, Union Street, Dundee.—7 p.m.

FRIDAY, JANUARY 13

E.P.E.A. (Southern Meter Engs. group).—"Cleaning by Trichlorethylene." C. F. Ditchfield. Tudor Room, Caxton Hall, S.W.1.—6.30 p.m.

MANCHESTER ASSN. ENGRS.—"Electric Winders." H. W. C. Liddiard. Engineers' Club, Albert Square, Manchester.—6.45 p.m.

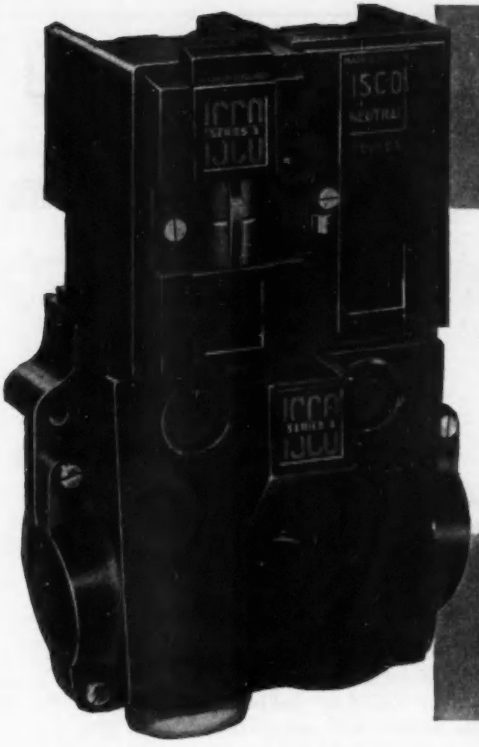
I.E.S. (Birmingham centre).—"Symposium of Papers." Imperial Hotel, Temple Street, Birmingham.—6 p.m.

ASSN. MINING, ELECTRICAL AND MECH. ENGRS. (S. Wales branch).—"Power Measurement at Collieries." T. L. Price. School of Mines, Pontypridd.—6 p.m.

I.E.E. (West Wales sub-centre).—Faraday lecture: "Radar." R. A. Smith. Brangwyn Hall, Swansea.—6.30 p.m.

I.E.E. (N.E. Scotland sub-centre).—"The Measurement of Light and Colour." G. T. Winch. Robert Gordon's Technical College, Aberdeen.—7-30 p.m.

A.S.E.E. (Nottingham branch).—"Electronics in Industry." F. E. Noakes. Spread Eagle Hotel, Goldsmith Street, Nottingham.—8 p.m.



Double-pole Insulated Service Fuse arranged for one fuse and one neutral connector with combined 4-entry sealing chamber.

Now available from stock

INSULATED SERVICE FUSES

UP TO 60 A 250 V

In the range of HENLEY Insulated Service Fuses there is an arrangement to meet your requirements. Please send us your enquiries.

The following are interesting features: —

- Double and Four-pole models with combined sealing chambers.
- Single-pole with Neutral Connector Boxes and separate 2 and 4-pole Sealing Chambers.
- Cartridge Fuse-Links to B.S.88:1947.
- For cable conductors up to .04 sq. in. or up to .06 sq. in.
- With single or double entry Terminals.
- All current carrying parts tinned.

Specialists for over fifty years

W. T. HENLEY'S TELEGRAPH WORKS CO. LTD.,
51-53 HATTON GARDEN,
LONDON, E.C.1

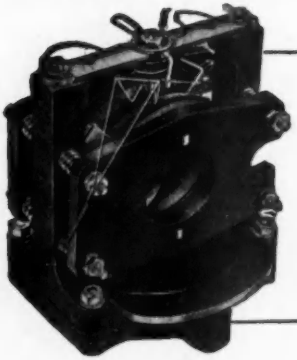
HENLEY
ELECTRICAL DISTRIBUTION EQUIPMENT

FEATURES OF WESTON SUPERIORITY

Weston

DYNAMOMETER SUB-STANDARD INSTRUMENTS

This latest development of the well-known 'Weston' sub-standard Wattmeter is made in three models, each of high-grade dynamometer type, designed for a wide range of precision measurements. The standard series is particularly suitable for meter standardisation and for use as a transfer standard between A.C. and D.C. circuits. Type 2 is recommended for low power factor circuits and Type 3 for higher power frequencies. Similar in size and design, each is housed in a lightweight Bakelite case, with easy reading 6″ scale, knife-edge pointer and anti-parallax mirror. The moving element is fitted with spring-loaded jewels, double magnetic shielding is employed and each instrument carries a certificate of individual performance and guarantee of accuracy to 0.25%. Ample voltage and current ranges are available by simple switching which can be safely applied when the instrument is on load. Model S67 (as illustrated). Size 11″ × 9½″ × 6⅜″. Weight 10 lbs. (approx.)



EXTREME RIGIDITY. An unique feature of these 'Weston' models is the self-contained assembly independent of the casing, thus ensuring extreme rigidity. The whole instrument is housed as one complete unit in an attractive Bakelite case with leather carrying strap and detachable cover. Ample shielding and the absence of metal parts eliminate errors due to external magnetic fields and eddy currents.

SANGAMO WESTON LIMITED

ENFIELD, MIDDLESEX - Tel.: Enfield 3434 (6 lines) & 1242 (4 lines)

Depots at Glasgow, Newcastle-on-Tyne, Manchester & Wolverhampton.

121

CLASSIFIED ADVERTISEMENTS

Official Tenders and Appointments · Situations Vacant · For Sale · Wanted

TENDERS INVITED

BOROUGH OF YEOVIL

PUBLIC LIGHTING SCHEME 1950-51

TENDERS are invited for the supply and erection of No. 35 (25 ft mounting height) and No. 23 (15 ft mounting height), STEEL ELECTRIC LIGHT COLUMNS, including lanterns, lamps, control gear and wiring.

Drawings and conditions of contract may be seen at and the necessary documents for tendering may be obtained from, the undersigned.

Tenders in the sealed envelope provided and endorsed "Public Lighting Scheme 1950-51," must be delivered to the Town Clerk, Municipal Offices, Yeovil, not later than Wednesday, January 25, 1950.

A. J. PRICE, A.M.I.C.E.,
Borough Surveyor.

Municipal Offices, Yeovil. (D 247)

APPOINTMENTS VACANT

None of the vacancies in these columns relates to a man between the ages of 18 and 50 inclusive, or a woman between the ages of 18 and 40 inclusive, unless he or she is excepted from the provisions of the Control of Engagement Order, 1947, or the vacancy is for employment excepted from the provisions of that Order.

BRITISH ELECTRICITY AUTHORITY

Merseyside and North Wales Division

APPLICATIONS are invited for the appointment of STATION MAINTENANCE ENGINEER at the Aberystwyth Generating Station.

The salary will be in accordance with Class "B," Grade 7 of the National Joint Board Schedule, at present £401, rising to £426 per annum, and should be regarded as provisional, subject to negotiation with the appropriate organisation.

Applicants should be experienced in the maintenance of Diesel Plant and some electrical experience is desirable. Consideration would be given to applications from certificated ex-seagoing men with a Diesel endorsement.

The appointment will be subject to medical examination and superannuation under terms and conditions approved by the British Electricity Authority.

Forms of application may be obtained from the Divisional Secretary, British Electricity Authority, Merseyside and North Wales Division, Clarke Gardens, Woolton, Liverpool, and should be returned in a sealed envelope endorsed in the top left-hand corner "Station Maintenance Engineer—Aberystwyth," so as to reach the Divisional Secretary at the above address not later than the first post on Monday, January 16, 1950. (D 303)

BRITISH ELECTRICITY AUTHORITY

Yorkshire Division

APPLICATIONS are invited for the appointment of GENERATION ENGINEER (Construction) at Divisional Headquarters, Leeds.

The salary will be within the range of £1,250 to £1,750 per annum, which should be regarded as provisional pending the negotiation of final scales with such organisations as are appropriate.

The appointment will be subject to the provisions of the British Electricity Authority and Area Boards Superannuation Scheme.

Applicants should have a sound engineering training and should be corporate members of one of the professional engineering institutions.

The duties will include the development of new generating station sites and the preparation of preliminary designs for new stations and extensions of existing stations. Applicants must have had experience in generating station construction, and preference will be given to candidates who, in addition, have specialised in civil engineering work.

Forms of application may be obtained from the Divisional Secretary, British Electricity Authority, Yorkshire Division, British Electricity House, St. Mary's Road, Leeds 7, to whom completed forms should be returned not later than 14 days from the appearance of this advertisement. Envelopes to be endorsed "Generation Engineer (Construction)."

G. A. VOWLES,
Divisional Controller.
(D 272)

MERSEYSIDE AND NORTH WALES ELECTRICITY BOARD

No. 2 Sub-Area

REVENUE SUPERINTENDENT

APPLICATIONS are invited for the appointment of Revenue Superintendent at the Board's No. 2 Sub-Area offices at Frodsham, Cheshire.

The salary will be within the range £600-£760 per annum according to qualifications and experience and will be provisional and subject to such variation as may be necessary to conform with scales of salaries agreed after negotiation with the appropriate organisation.

The duties of the post will include the control of meter readers and collectors and the billing and collection of revenue.

Experience in a similar position is essential and possession of a recognised accountancy qualification would be an advantage. The successful candidate will be required to satisfy the Board's medical adviser and to contribute to a superannuation scheme.

Applications should be addressed to the Manager, No. 2 Sub-Area, Merseyside and North Wales Electricity Board, Sandiway House, near Northwich, Cheshire, and endorsed "Revenue Superintendent," to reach him not later than January 17, 1950.

JAMES RANKIN,
Secretary.
(D 262)

BRITISH ELECTRICITY AUTHORITY

South Western Division

JUNIOR CONTROL ENGINEER
HAYLE POWER STATION (CORNWALL)

APPLICATIONS are invited for the position of Junior Control Engineer at the Hayle Power Station, at a salary in accordance with Class "G," Grade 10, of the National Joint Board Schedule.

Applicants should possess the National Certificate in Electrical or Mechanical Engineering and previous experience in a power station would be considered an advantage.

The appointment will be subject to superannuation under the terms of the British Electricity Authority and Area Boards Superannuation Scheme.

Applications, stating age, qualifications, experience, and present position, should be addressed to the Generation Engineer (Operation), British Electricity Authority, South Western Division, Oakfield Place, Elliott Road, Prince Rock, Plymouth, Devon, so as to reach him not later than January 14, 1950.

R. C. BARRETT,
Divisional Secretary.

December 31, 1949. (D 298)

BRITISH ELECTRICITY AUTHORITY

Midlands Division

APPLICATIONS are invited for the appointment of GENERATION ENGINEER (Operation) Midlands Division.

The salary will be provisionally within the range £1,250-£1,750 per annum dependent upon qualifications and experience and subject to negotiation with the appropriate organisations.

Applicants should be corporate members of the Institution of Electrical Engineers and Institution of Mechanical Engineers, or alternatively hold a University degree covering both electrical and mechanical engineering.

The successful candidate will be responsible to the Chief Generation Engineer (Operation) for the organisation, administration and efficient operation of the Southern Group of power stations within the division. Applicants should have obtained extensive experience in modern steam power station operation at high pressures and temperatures, and be fully conversant with pulverised fuel burning in large boilers. Considerable administration experience in the handling of power station personnel is essential.

Applications should be made on forms which can be obtained from the Divisional Establishments Officer, 53 Wake Green Road, Moseley, Birmingham 13, and returned to the Divisional Controller not later than January 28, 1950.

F. W. LAWTON,
Divisional Controller.
(D 304)

NORTH WESTERN ELECTRICITY BOARD

No. 7 Sub-Area

APPOINTMENT OF DRAUGHTSMEN AND ASSISTANT DRAUGHTSMEN

APPLICATIONS are invited for the appointment of Draughtsmen and Assistant Draughtsmen in the following district offices:—

7A District—Tiviot Dale, Stockport.
7B District—Water Lane, Wilmslow.
7C District—"Thornfield," Spring Bank, New Mills.
7D District—Mill Street, Macclesfield.

DRAUGHTSMEN.—Candidates must have had a good general technical education, with experience in mains records, electrical network diagrams, etc.

Salary within the range £400-£500 per annum, according to qualifications and experience.

ASSISTANT DRAUGHTSMEN.—Candidates must have had experience in mains records, electrical network diagrams, etc.

Salary within the range £300-£375 per annum, according to qualifications and experience.

These salaries are provisional and are subject to negotiations with the appropriate body.

Applications, stating age, qualifications, and experience, present position and salary, should be received by J. Harwood Lumsden, Esq., M.I.Mech.E., Sub-Area Manager, No. 7 Sub-Area, Chapel Street, Hazel Grove, not later than Monday, January 23, 1950. (D 267)

MUNICIPALITY OF SINGAPORE

Electricity Department

APPOINTMENT OF CHARGE ENGINEER

THE Muhicipal Commissioners of the Town of Singapore invite applications for filling two vacant posts of Charge Engineer for shift duties at their power station. The present installed capacity is 37,000 kW, but extensions are in hand to increase this capacity to 87,000 kW.

Applicants must possess a thorough experience of extra h.t. 3-phase generation, steam turbine and high pressure water tube boilers in a modern power station. Practical experience in a high pressure steam power station is essential.

The post is on the permanent staff of the electricity department and is in Class III of the Senior Officers' Salary Scheme with a salary range of $440xA$30-$590—$630 x A$30 - $750 / Qualification Bar / $790 x A$40 - $870. The commencing salary in this scale will be fixed according to the qualification and experience of the successful candidate. Current cost of living allowance will be payable and the present rates for officers resident in Singapore are as follows :—60 per cent on the first $200 a month of basic salary plus (i) single officers 20 per cent on the next $500 a month of basic salary, (ii) married officers with no dependent children 35 per cent on the next $500 a month of basic salary, (iii) married officers with one or more dependent children 55 per cent on the next $500 a month of basic salary, subject to the following maxima :—(i) $220 a month, (ii) $295 a month, and (iii) $395 a month.

Expatriation allowance where applicable is payable at the following rates :—

Monthly basic salary from $420 up to $599—$110 a month.
Monthly basic salary from $600 up to $750—$150 a month.
Monthly basic salary from $751 up to $870—$170 a month.

The exchange value of the Straits dollar is 2s. 4d. sterling.

The minimum commencing salary offered to a single man is, therefore, £1,005 per annum, with increases if married.

Basic salary, expatriation allowance and cost of living allowance are subject to local taxation.

Partly furnished quarters will be provided, if available, at a charge of 8 per cent of the officer's salary. If quarters are not available, a housing allowance is payable. The present rate is 12 per cent of basic salary, maximum $120 per month.

The candidate selected would be appointed on a three years' agreement and would be required to pass a medical examination and to join the Municipal Provident Fund under the present rules of which he must contribute 7½ per cent of his salary and expatriation allowance. On completion of the agreement and subject to satisfactory service, the officer would normally be appointed to the permanent establishment. Leave, with full salary, at the rate of two months for each year of resident service, is normally granted after four years' service.

A free passage will be provided for the officer and, if married, for his wife and children under 17 years of age (up to a maximum of three full passages) together with half salary on the voyage out to Singapore.

Applications, stating age, whether married or single, birth place, details of education, qualifications, training and experience, accompanied by copies of three recent testimonials must be lodged with Messrs. Peirce and Williams, No. 1, Victoria Street, Westminster, London S.W.1 (Agents to the Municipal Commissioners), not later than January 27, 1950.

Further information, if desired, can be obtained from the Agents or the Municipal Electrical Engineer, Singapore. (D 249)

NORTH WESTERN ELECTRICITY BOARD

No. 1 Sub-Area

ASSISTANT ELECTRICAL ENGINEER (PROTECTIVE GEAR)

APPLICATIONS are invited for the position of Assistant Electrical Engineer in the Design and Planning Section of No. 1 (Manchester) Sub-Area to deal with protective gear.

The position will carry with it the responsibility for determining all relay settings in the Sub-Area, which comprises a large industrial system fed from several power stations.

Candidates should hold a degree in electrical engineering or a Higher National Certificate, and preferably have served an apprenticeship with a manufacturing firm, followed by several years' experience in a responsible position with a supply undertaking serving a large industrial area.

A sound knowledge of modern protective systems is of first importance and drawing office experience and a good knowledge of modern high breaking capacity switchgear as applied to power networks will be additional qualifications.

The provisional salary will be within the range £650-£800 per annum, depending upon experience and qualifications. The post is superannuable.

Applications, stating age, qualifications, training and experience, present position and salary, should be received by the Establishment Officer, The North Western Electricity Board, Cheetwood Road, Manchester 8, not later than January 21, 1950. (D 265)

MIDLANDS ELECTRICITY BOARD

Birmingham and District Sub-Area

APPLICATIONS are invited for the position of BUILDING SUPERINTENDENT in the Sub-Area Engineer's Department.

Applicants should be experienced in modern building practice, have served a full apprenticeship with the building trade, and be conversant with labour conditions and prices of materials. A knowledge of reinforced concrete work and practical experience as clerk of works on building contracts will be considered an advantage.

The successful applicant will be required to take charge, under the Constructional Assistant, of the Building Department and to supervise all maintenance work and building work undertaken by direct labour, principally associated with offices, showrooms, depots, sub-stations, and steel transformer kiosks.

The salary will be in accordance with the N.J.B. Schedule, Class "O," at a grade between 9a and 8b, at present £577-£669 per annum, dependent upon qualifications and experience.

The successful applicant will be required to contribute to the Board's Superannuation Scheme.

Applications, giving full details of experience, age, present position and salary, should be forwarded in a sealed envelope endorsed "Building Superintendent," within 14 days, to Emil Braathen, Manager, Midlands Electricity Board, Birmingham and District Sub-Area, 14 Dale End, Birmingham 4.

A. STEPHENS,
Secretary.
(D 302)

BRITISH ELECTRICITY AUTHORITY

London Division

APPLICATIONS are invited for the following positions in the Transmission Construction Department :—

SECOND ASSISTANT TRANSMISSION CONSTRUCTION ENGINEER

Candidates should have received sound training as Electrical Engineers, be Corporate Members of the I.E.E. and also have had experience in connection with the design, manufacture and erection of high voltage transmission plant, together with experience of site testing and commissioning of Substation plant and associated protective equipment.

The salary will range from £707 8s. to £838 13s., plus 5 per cent London Area, and is provisional and subject to negotiation with the appropriate organisations.

ASSISTANT SECTION ENGINEER

Applicants should possess the Higher National Certificate in Electrical Engineering, and should have had experience in the maintenance and operation of high tension transmission systems and sub-station equipment.

The salary will range from £471 3s. to £602 8s., plus 5 per cent London Area, and is provisional and subject to negotiation with the appropriate organisations.

Applications for both the foregoing vacancies stating age, qualifications and experience, should be addressed to the Acting Divisional Secretary, British Electricity Authority, London Division, Ergon House, Horseferry Road, Westminster, S.W.1, and be received within fourteen days of the appearance of this advertisement.

J. N. WAITE,
Divisional Controller.
(D 296)

MERSEYSIDE AND NORTH WALES ELECTRICITY BOARD

No. 2 Sub-Area

APPOINTMENT OF SENIOR SALES ASSISTANT

APPLICATIONS are invited for the appointment of a Senior Sales Assistant for the electricity service centres in No. 2 District (Warrington), at a salary within the range £400-£500.

The post is under the supervision of a district commercial officer and the duties include the supervision and control of the showroom and service centres, display of apparatus and window dressing, hire and hire-purchase transactions, and collection of electricity accounts which are payable at the showrooms.

Applicants must have had a sound training on the commercial side of an electricity undertaking and a wide knowledge of modern electrical appliances for commercial and domestic use.

The successful applicant may be required to undergo a medical examination and, if eligible, will be required to contribute to a superannuation scheme.

The salary offered is provisional and subject to such adjustment as may be necessary to conform to scales of salaries to be negotiated with the appropriate staff organisation.

Application forms may be obtained from the Manager, No. 2 Sub-Area, Sandiway House, near Northwich, Cheshire, and should be returned to him not later than Friday, January 20, 1950.

JAMES RANKIN,
Secretary.
(D 263)

SOUTHERN ELECTRICITY BOARD

No. 3 (Portsmouth) Sub-Area

APPLICATIONS are invited for the appointment of LINESMEN (Overhead Power) in the No. 3 (Portsmouth) Sub-Area at Aldershot and Portsmouth. Applicants should have experience in the erection of h.v. and l.v. overhead transmission and distribution lines, having wood pole supports.

The wages and conditions of service are as set out in the National Joint Industrial Council's Agreement for the electricity supply industry.

Applications, stating the district preferred, should be made in writing to the Sub-Area Secretary, Southern Electricity Board, Lower Drayton Lane, Cosham, Portsmouth, by not later than January 31, 1950. (D 294)

BRITISH ELECTRICITY AUTHORITY

Midlands Division

APPLICATIONS are invited for the position of ASSISTANT CHEMIST at Meaford Generating Station Class "J," Grade 8b, commencing salary £494 per annum

Candidates should have sound general laboratory experience, particularly in water, fuel, and oil analysis, and be fully conversant with power station chemistry including coal sampling and water treatment. A university degree in chemistry or A.R.I.C. will be considered an advantage.

Salary and conditions of service will be in accordance with the N.J.B. Agreement and superannuation under terms and conditions approved by the British Electricity Authority.

Applications should be made on forms obtainable from the Establishments Officer, 53 Wake Green Road, Moseley, Birmingham 13, and be returned not later than January 14, 1950.

F. W. LAWTON,
Divisional Controller.
(D 257)

BRITISH ELECTRICITY AUTHORITY

South Western Division

SHIFT CHARGE ENGINEER—BATH GENERATING STATION

APPLICATIONS are invited for the position of Shift Charge Engineer at Bath Generating Station. Salary and conditions in accordance with N.J.B. Schedule, Class "G," Grade 8.

Applicants should have good technical qualifications and a sound knowledge of the operation and maintenance of generating plant, preferably in relation to Brush-Ljungstrom turbines and stoker-fired boilers.

The appointment will be subject to superannuation under terms and conditions to be approved by the British Electricity Authority.

Applications, stating age, qualifications and experience, should be addressed to the Generation Engineer (Operation), British Electricity Authority, South Western Division, Generating Station, Portishead, Bristol, so as to be received not later than January 16, 1950.

R. C. BARRETT,
Divisional Secretary.
December 19, 1949. (D 243)

SOUTH WESTERN ELECTRICITY BOARD

THE Board invite applications from suitably qualified persons for the following appointments:—

1. Exeter and East Devon Sub-Area

(a) OPERATION AND MAINTENANCE ENGINEER, North Devon District (Headquarters Barnstaple).
Provisional salary, £486 per annum (Grade 7, Class "E").
Applicants should be thoroughly familiar with the operation and maintenance of urban and rural supply networks up to 33 kV, including sub-station equipment, protective gear, fault localisation, and safety regulations, and be accustomed to controlling men.
(b) METER SUPERINTENDENT, North Devon District (Headquarters Barnstaple).
Provisional salary £486 per annum (Grade 7, Class "E").
A sound engineering training and experience of the administrative and technical organisation of a Class A non-polyphase testing station is necessary. Candidates should also be conversant with the repair and calibration of instruments.
(c) MAINS ASSISTANTS at Tiverton, South Molton, Lynton, and Exmouth Branch Offices.
Provisional salaries range between £400 and £450 per annum.
Candidates should have had a sound general and technical education and thorough experience in the operation, maintenance and construction of u.g. and o.h. h.v./l.v. distribution systems, including ancillary equipment; they should be used to the control of men.

2. Torquay and West Devon Sub-Area

(a) PLANNING ENGINEER, Torbay District (Headquarters Torquay).
Provisional salary £615 per annum (Grade 6, Class "H").
A good electrical engineering training and considerable experience in the design of o.h. lines, planning of distribution systems, including l.v. and h.v. mains up to 33 kV, and in design and layout of sub-stations is necessary.
(b) CONSTRUCTION ENGINEER, Torbay District (Headquarters Torquay).
Provisional salary £615 per annum (Grade 6, Class "H").
Applicants should have had good practical experience of l.v. and h.v. o.h. line construction up to 33 kV, laying and jointing of l.v. and h.v. mains and equipping of sub-stations. A knowledge of building construction would be an advantage.
(c) SURVEYORS, Torbay District (Headquarters Torquay) and West Devon District (Headquarters Bideford).
Provisional salaries within range £450 to £500 per annum.
The successful candidates will be required to undertake all surveying work for distribution systems, including the preparation of profiles and quantity schedules for o.h. lines and u.g. cables.
(d) SENIOR DRAUGHTSMAN, West Devon District (Headquarters Bideford).
Provisional salary within range £425 to £475 per annum.
Extensive experience in the design of o.h. lines and preparation of profiles and quantities therefor, and experience in the design and layout of sub-stations up to and including 33 kV, is necessary.

For the senior posts, possession of appropriate technical qualifications will be an advantage.

The salaries for all these posts are provisional pending the adoption of nationally negotiated scales.

Detailed applications, stating for which post(s) candidates desire to be considered, should be submitted to the Assistant Secretary (Establishments), South Western Electricity Board, Electricity House, Colston Avenue, Bristol 1, within ten days. (D 297)

EASTERN ELECTRICITY BOARD

SALES ASSISTANTS—NORTHMET SUB-AREA

APPLICATIONS are invited for the positions of Sales Assistant at:
(a) Harrow District.
(b) Hertford District.

Applicants should have technical training, preferably to that of the Higher National Certificate of Electrical Engineering. The successful applicants will be required to prepare estimates and specifications of electrical installations under the general supervision of the District Commercial Officer.

The provisional salaries for these appointments will be:
(a) Harrow District—£525 a year plus London Weighting.
(b) Hertford District—£400 a year.

Future salaries and conditions of service will be in accordance with agreements made from time to time by the appropriate negotiating bodies.

The successful candidates will be required to contribute to a Superannuation Scheme and may be required to undergo a medical examination.

Application forms may be obtained from the following addresses to whom completed forms should be returned within fourteen days of the appearance of this advertisement.

(a) District Manager, Harrow, Northmet Sub-Area, Eastern Electricity Board, 4 College Road, Harrow.
(b) District Manager, Hertford, Northmet Sub-Area, Eastern Electricity Board, Bridgefoot, Ware, Hertfordshire. (D 288)

MIDLANDS ELECTRICITY BOARD

North Staffordshire Sub-Area

APPLICATIONS are invited for the following posts:—

SUB-AREA OVERHEAD LINE SURVEYOR
(Located at Stoke-on-Trent)

Applicants must have been trained in and had experience of surveying and levelling and should be able to prepare accurate profiles and plans for overhead lines of heavy and light construction.

The salary will be within the range £480–£525 per annum according to experience.

WAYLEAVE OFFICER-SURVEYOR, LEEK DISTRICT

Applicants should have experience in the negotiation of Wayleave Agreements and some knowledge of valuation and compensation. They should also have been trained in surveying and levelling and be able to prepare accurate profiles and plans for overhead lines.

The salary will be within the range £390–£430 per annum according to experience.

JUNIOR ASSISTANT ENGINEERS
NEWCASTLE AND MARKET DRAYTON DISTRICTS

Applicants should preferably have had experience in all branches of distribution work, including operation, maintenance and construction of overhead lines, underground cables and substations. Appropriate technical qualifications and background will be an advantage.

The appointment will be in accordance with N.J.B. conditions. The salary will be within the range £360–£395 per annum.

ASSISTANT CONSUMERS' ENGINEER, STAFFORD DISTRICT

Applicants should have had experience in consumer service and installation contracting work.

The appointment will be in accordance with N.J.B. conditions. The provisional salary will be within the range £400–£450 per annum.

The salaries for all the above posts will be provisional and subject to negotiation with such organisations as may be appropriate.

MAINS FOREMAN, STOKE-ON-TRENT CENTRAL DISTRICT

Applicants should have good experience of mains work generally, including h.v. and l.v. jointing and cable laying.

Wages and conditions of service will be in accordance with the agreement of the National Joint Industrial Council for the Electricity Supply Industry.

Applications for all the above posts, stating age, experience and present position, should be appropriately endorsed and sent within 14 days to H. A. P. Caddell, Esq., B.A., M.I.E.E., Sub-Area Manager, North Staffordshire Sub-Area, Midlands Electricity Board, 31 Kingsway, Stoke-on-Trent.

A. STEPHENS,
Secretary.
(D 269)

EAST MIDLANDS ELECTRICITY BOARD

APPLICATIONS are invited for the position of CHIEF ACCOUNTANT to the Board.

Applicants must possess recognised accountancy qualifications and have a comprehensive knowledge and experience of accountancy in the electricity supply industry.

The salary upon appointment will be within the range £2,000 to £2,750 per annum.

Applications stating age, qualifications, experience and present position should be forwarded in an envelope endorsed "Chief Accountant" to the Secretary, The East Midlands Electricity Board, Mapperley Hall, Nottingham, to arrive not later than January 27, 1950. (D 287)

BRITISH ELECTRICITY AUTHORITY

Eastern Division

APPLICATIONS are invited for the following appointment:—

SENIOR CONTROL ROOM ENGINEER, THORPE GENERATING STATION (NORWICH)

Salary in accordance with N.J.B. Schedule, Grade 9a, Class "H" (£396–£415 per annum).

Applicants should have experience of power station switchboard operation, have followed a course of technical training, and have reached a standard of Ordinary National Certificate in Electrical Engineering or its equivalent.

The salary is in accordance with the scale at present operating, but may be subject to negotiation through the medium of the Joint Board.

The appointment will be superannuable in accordance with the British Electricity Authority and Area Board Superannuation Scheme.

Applications, stating age, experience, and present position, should be sent to the Divisional Controller, British Electricity Authority, Eastern Division, Northmet House, Southgate, N.14, to arrive not later than January 13, 1950. Envelopes should be endorsed "Senior Control Room Engineer, Norwich."

W. N. C. CLINCH,
Controller.
Northmet House, Southgate, N.14. (D 234)

SOUTH WESTERN ELECTRICITY BOARD

APPLICATIONS are invited for the position of EDUCATION AND TRAINING OFFICER at Area Board Headquarters, Bristol.

Candidates should possess an academic background (preferably with engineering bias) and previous experience in the organisation, and administration of training schemes relevant to the electricity supply industry is desirable.

The duties attached to the post will include all matters relating to formulation and organisation of training schemes, including special intensive courses, weekend schools, etc., preparation of syllabuses, recruitment and selection of trainees, and liaison with education authorities and other bodies.

The provisional salary for this appointment will be within the range £750–£950 per annum, according to the successful candidate's qualifications and experience.

Detailed applications should be submitted to the Assistant Secretary (Establishments), South Western Electricity Board, Electricity House, Colston Avenue, Bristol 1, within ten days. (D 248)

SOUTH WESTERN ELECTRICITY BOARD

APPOINTMENT OF AGRICULTURAL EXHIBITION ASSISTANT

APPLICATIONS are invited for the position of Agricultural Exhibition Assistant in the Chief Commercial Officer's Department at Area Headquarters, Bristol.

The person appointed will be required to assist in the design, preparation, and layout of agricultural exhibitions, and experience of these matters, including technical knowledge of the application of electricity to agriculture and horticulture, together with a flair for display work is essential.

Corporate membership of the Institution of Electrical Engineers will be an advantage.

The salary, which is provisional pending the adoption of nationally negotiated scales, will be within a range £650 to £750 per annum, according to the successful applicant's qualifications and experience.

Applications should be submitted to the Assistant Secretary (Establishments), Electricity House, Colston Avenue, Bristol 1, within 10 days. (D 252)

NORTH WESTERN ELECTRICITY BOARD

No. 4 Sub-Area

APPOINTMENT OF ASSISTANTS TO THE SYSTEM PLANNING ENGINEER

APPLICATIONS are invited for the positions of Assistant in the System Planning Section of the Technical Engineer's Department.

The salary, which will be within the range of the Board's Grade 3 salary, i.e. £400–£500 per annum, according to qualifications and experience, is provisional, pending the conclusion of national negotiations, and subject to deduction for superannuation purposes.

Applicants should be experienced in the layout of high-voltage and medium-voltage networks, sub-station design, network calculations, possess some knowledge of protective equipment, and should hold an engineering degree or be of Higher National Certificate standard.

Applications, stating age, education, qualifications and experience, present position and salary, should be received by G. A. Robertson, Esq., M.Sc.Tech., M.I.E.E., M.I.Mech.E., Sub-Area Manager, No. 4 Sub-Area, The North Western Electricity Board, 40-41 Lune Street, Preston, not later than Wednesday, January 18, 1950. (D 266)

BRITISH ELECTRICITY AUTHORITY

Eastern Division

APPLICATIONS are invited for the following appointment:—

ASSISTANT CONTROL ENGINEER

Little Barford Generating Station. Salary in accordance with N.J.B. Schedule Grade 10b, Class "J" (£347–£360 per annum).

Preference will be given to applicants who have had previous experience in the operation of a switchboard at a generating station, and who have reached the standard of ordinary National Certificate in Electrical Engineering or its equivalent.

The salary is in accordance with the scale at present operating, but may be subject to negotiation through the medium of the Joint Board.

The appointment will be superannuable in accordance with the British Electricity Authority and Area Board Superannuation Scheme.

Applications, stating age, experience and present position, should be sent to the Divisional Controller, British Electricity Authority, Eastern Division, Northmet House, Southgate, N.14, to arrive not later than January 20, 1950. Envelopes should be endorsed "Assistant Control Engineer," Little Barford.

W. N. C. CLINCH,
Controller.
Northmet House, Southgate, N.14. (D 295)

SOUTHERN ELECTRICITY BOARD

No. 1 (Southall) Sub-Area

LADY COOKERY DEMONSTRATOR/SHOWROOM ASSISTANT

APPLICATIONS are invited for the position of Lady Cookery Demonstrator at Chiswick, London W.4.

Applicants should hold recognised domestic science diploma and/or E.A.W. Certificate, and have experience in conducting demonstrations of cooking and domestic appliances in the showroom and on consumers' premises, and also in keeping appropriate records.

Grade "A," £330 per annum, plus London weighting appropriate to age. Electricity Supply Industry National Joint Council (Administrative and Clerical Grades) terms and conditions of employment. Successful applicant will be required to join the B.E.A. and Area Boards' Superannuation Scheme if and when eligible.

Applications should be made to the Sub-Area Secretary, No. 1 (Southall) Sub-Area, Southern Electricity Board, 2-6 Windmill Lane, Southall, Middlesex, on forms obtainable from him. (D 264)

SECOND ADVERTISEMENT.

CITY OF SHEFFIELD

PUBLIC LIGHTING ENGINEER

APPLICATIONS are again invited from qualified and experienced persons for the whole-time appointment of Public Lighting Engineer. A wide knowledge of street lighting, both by gas and electricity, is essential.

The salary attached to the appointment will be £850, rising by annual increments of £50 to £1,000 per annum.

The appointment will be subject to a medical examination, three months' notice on either side, the provisions of the Local Government Superannuation Act, 1937, and conditions of service similar to those of the National Joint Council for Local Authorities' Staffs, as applied by the Council.

Applications, on the official form to be obtained from the undersigned, must be delivered at my office not later than Monday, January 25, 1950.

Those who have already submitted applications need not do so again.

Canvassing, whether direct or indirect, is prohibited and will be a disqualification.

JOHN HEYS,
Town Clerk.

Town Hall, Sheffield 1.
December, 1949. (D 279)

SOUTHERN ELECTRICITY BOARD

No. 1 (Southall) Sub-Area

APPLICATIONS are invited from suitably qualified and experienced engineers for the following posts on the staff of the Sub-Area Engineering Department, Waterloo Road, Uxbridge, Middlesex.

SUB-AREA CONSTRUCTION ENGINEER (excluding Civil Works). The successful candidate will be responsible to the Sub-Area Engineer for the installation and erection of plant, equipment, overhead lines, the laying of mains and other constructional work related to urban and rural distribution systems at pressures up to and including 33 kV, together with testing and commissioning of the foregoing. He will be required to arrange for and supervise works carried out by direct labour and/or outside contract.

The provisional salary for the post will be between £825 and £875 per annum, according to qualifications and experience.

ASSISTANT CONSTRUCTION ENGINEERS (excluding Civil Works). Successful candidates will be responsible to the Sub-Area Construction Engineer to assist in the duties mentioned above at any point in the Sub-Area.

The provisional salary for the posts will be £550 per annum.

GENERAL ASSISTANT ENGINEER. The successful candidate will be responsible to the Sub-Area Mains Engineer for such general technical duties as may be assigned to him and should have had experience in the design, construction, operation, and maintenance of h.v. and l.v. underground and overhead distribution systems, sub-station plant, and distribution equipment.

The provisional salary for this post will be £550 per annum.

The successful candidates will be required to join the B.E.A. and Area Boards Superannuation Scheme, if eligible, and all posts will be governed by the National Joint Board Conditions of Service.

The foregoing salaries are provisional and subject to adjustment by the appropriate negotiating machinery.

Applications should be made to the Sub-Area Secretary, No. 1 (Southall) Sub-Area, Southern Electricity Board, 2-6 Windmill Lane, Southall, Middlesex, on forms obtainable from him and should be returned to him not later than January 15, 1950.

F. W. KEMPTON,
Secretary.
(D 280)

SOUTH WALES ELECTRICITY BOARD

APPLICATIONS are invited for the position of an ASSISTANT TO THE SUB-AREA COMMERCIAL OFFICER in the Western Sub-Area of the Board at Tenby.

Applicants should have had experience in l.t. development, installation work, street lighting, and other such applications of electricity.

Applicants should possess a minimum qualification of the corporate membership of the Institute of Electrical Engineers or its equivalent.

The salary for the position is provisional until such time as the final grading is determined by the appropriate negotiating machinery and will be at the rate of £650 per annum.

Applications, stating age, qualifications, experience, present position, present salary, whether married or single (together with the names and addresses of three referees) should be addressed to the Secretary (Establishments Section), The South Wales Electricity Board, St. Mellons, near Cardiff, so as to reach him not later than January 14, 1950. (D 255)

SOUTH EASTERN ELECTRICITY BOARD

JUNIOR ASSISTANT DISTRIBUTION ENGINEER, Woking district. Provisional salary of £330 p.a. under N.J.B., Class "G," Grade 10a. Superannuation will be arranged. Applicants should have experience in the distribution department of an electricity undertaking and preferably be in possession of the Higher National Certificate or equivalent qualification.

Applications, giving two referees, must reach F. Woods, Esq., M.I.E.E., District Manager, South Eastern Electricity Board, Chobham Road, Woking, Surrey, by January 16, 1950.

A. L. BURNELL,
Secretary.
December, 1949. (D 299)

BRITISH ELECTRICITY AUTHORITY

Southern Division

APPOINTMENT OF SHIFT CHARGE ENGINEER

APPLICATIONS are invited for the position of Shift Charge Engineer at the Portsmouth Generating Station. The salary for the position (which is provisional and subject to negotiation) will be Grade 7 of the National Joint Board's Schedule, at present Class "J," £606 per annum.

Applicants should preferably be in possession of technical qualifications admitting to corporate membership of a recognised professional institution, have had previous experience in a large modern generating station, and have had manufacturing works experience.

Forms of application may be obtained from the Divisional Secretary. The latest date for the return of applications is January 18, 1950.

P. D. A. OLIVER,
Divisional Secretary.

British Electricity House,
High Street, Portsmouth. (D 306)

YORKSHIRE ELECTRICITY BOARD

No. 1 (Bradford) Sub-Area

APPLICATIONS are invited for the following appointments:—

Bradford District Testing Station
2 METER TESTERS
3 METER REPAIRERS (Mechanical)

Keighley District Testing Station
METER TESTER
2 METER REPAIRERS (Mechanical)

The rate of pay and conditions of service are those agreed by the National Joint Industrial Council for the Electricity Supply Industry, the present rate of pay for either grade being 2s. 11d. per hour for a 44-hour five-day week.

Applications, stating age, details of experience, and present employment should be addressed to the Manager, No. 1 (Bradford) Sub-Area, Yorkshire Electricity Board, 45-53 Sunbridge Road, Bradford, within 14 days of the appearance of this advertisement. (D 276)

A VERY large provincial engineering firm, mass producing a variety of products, require a CHIEF INSPECTOR with the following qualities:—

(1) He must be a first-class leader with a past record to substantiate the fact.

(2) He must have organising ability of the highest order.

A substantial salary will be paid to the right man. When replying please quote reference N/6, Box No. 1687, Electrical Times. (D 251)

AFRICAN CABLES, LTD., require TEST ROOM ASSISTANT, preferably with experience in the testing of both rubber and paper insulated cables. Minimum technical qualification, Higher National Certificate in Electrical Engineering. Must be single. Initial salary £500 per annum, plus C.O.L.A. (at present £60 per annum). Passage will be paid to South Africa.—Replies in the first instance to Box No. 1693, Electrical Times. (D 261)

APPLICATIONS are invited from ELECTRICAL ENGINEERS with a sound knowledge of switchgear, for appointments at the Nelson Research Laboratories, Stafford. A degree in electrical engineering and an interest in development are desirable. Duties will include short-circuit testing of switchgear.—Write, giving full details of age, qualifications, and experience, quoting Ref. No. 299, to Central Personnel Services, English Electric Co., Ltd., 24 Gillingham Street, Westminster S.W.1. (D 277)

AREA REPRESENTATIVE required by manufacturers distribution gear, to take over large connection and operate throughout area boards 3, 4, 7 and 8. Knowledge of overground and underground distribution systems.—Write, with full details age, experience, previous appointments and qualifications, to Box No. 1701, Electrical Times. (D 310)

ASSISTANT WORKS MANAGER for heavy electrical repair and manufacturing works. Extensive practical experience essential. Small detached house available in pleasant suburb, North Midlands.—Box No. 1687, Electrical Times. (D 291)

CHARGE SHIFT ENGINEER required for industrial power station. Applicants should, in addition to technical training, have had good experience in the operation of power station plant, including high and low pressure boilers, turbo alternators, e.h.t. and l.t. switchgear. Salary schedule according to Class "G," at present £505 per annum commencing. Applications should be accompanied by copies of recent testimonials, and give age and details of training, qualifications, experience, etc., and addressed to the Chief Engineer, Slough Estates Ltd., Trading Estate, Slough. (D 261)

DRAUGHTSMAN required by manufacturers of industrial electric cooking and heating equipment, Midlands. State age, experience and salary required.—Box No. 1685, Electrical Times. (D 250)

DRAUGHTSMEN wanted with experience of layout and/or design of automatic motor control gear and l.t. switchgear. Good prospects, good and cheap hostel accommodation available for unmarried men. A.E.S.D. rates. Location within 30 miles of Bristol (Somerset side).—Apply, stating age and experience, Box No. 1667, Electrical Times. (D 183)

ELECTRICAL INSPECTORS required by major oil company operating in Middle East. Applicants should have a wide experience of inspection and testing of motors, switchgear, and the electrical equipment associated with modern large generating stations, substations, and transmission and distribution networks with voltage range of 33 kV to 440 V. Knowledge of flameproof equipment an advantage. Possession of Higher National Certificate essential and qualifications up to A.M.I.E.E. desirable. Age limit 37 years. Attractive salary, plus generous allowance in local currency, free passages out and home, free medical attention, kit allowance, pension scheme, good leave arrangements.—Write, stating age and full details of qualifications and experience, quoting Dept. F.182, to Box 2333 at 191 Gresham House, E.C.2. (C 304)

ELECTRICIAN WIREMAN required, experienced all systems.—Apply in writing, Giffords, Basingstoke. (D 271)

FERRANTI LIMITED have vacancies in their Radio Works, Moston, Manchester, for Physicists and Engineers for research and development work on vacuum and gas-filled electronic devices, as follows :—

(a) SENIOR DEVELOPMENT ENGINEERS.

Qualifications include a good degree in physics or electrical engineering, and extensive experience in a responsible capacity in the electronics field.

(b) DEVELOPMENT ENGINEERS.

Qualifications include a good degree in physics or electrical engineering or suitable extensive experience in electronics.

Salary on a liberal basis, according to qualifications and experience.

The company has a staff pension scheme.

Application forms from the Staff Manager, Ferranti Limited, Hollinwood, Lancs. (D 179)

JOHNSON AND PHILLIPS, LTD., invite applications for the position of SENIOR TECHNICAL SALES ENGINEER in London for switchgear, transformers and mains cable.—Applications, detailing training, qualifications and subsequent experience should be addressed to the Sales Manager, Johnson and Phillips Ltd., Columbia House, Aldwych, London W.C.2. (D 282)

SIMPLEX ELECTRIC COMPANY

SENIOR DESIGN DRAUGHTSMAN, experienced in all types of industrial lighting equipment, wanted immediately for works in North Staffs district.—Apply, stating age, experience, and salary required, to Personnel Manager, Simplex Electric Co., Ltd., Oldbury. (D 274p)

BOX No. replies to be addressed to the ELECTRICAL TIMES, Sardinia House, Sardinia Street, London W.C.2

JUNIOR ASSISTANT required in electric motor design office. State experience, salary, etc. to Higgs Motors, Witton, Birmingham 6. (D 239)

JUNIOR TECHNICAL ENGINEERS required for electrical manufacturers' works in Home Counties. Applicants, preferably aged 20/25, must have received practical and theoretical training and must be prepared to travel in U.K. Position involves technical correspondence mixed with service work with prospects of promotion to technical sales engineers.—Replies to Box No. 1679, Electrical Times. (D 206)

LEADING (E.L.F.A.) manufacturers of electric light fittings require experienced DESIGNER-DRAUGHTSMAN. Applicants must be familiar with manufacturing methods, particularly for fluorescent fittings, and be capable of producing detailed manufacturing drawings from appearance designs or specifications.—Applications, stating age, experience, and salary required should be addressed to Box No. 1663, Electrical Times. (D 242)

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INDEX TO ADVERTISERS

Aberdare Cables, Ltd. 70
Allied Ironfounders, Ltd. ... 55
Arora Co., Ltd. 60
Ash & Lacy, Ltd. 58
Auto Light Controlling Co., Ltd. 64

Bestfrend Electrical Co., Ltd. ... 64
Best Products, Ltd. 50
Brit. Central Elec. Co., Ltd. ... 19
Brit. Driver-Harris Co., Ltd. ... 58
Brit. Elec. Resistance Co., Ltd.... 65
Brit. Ins. Callender's Cables, Ltd. 11
Brit. Thomson-Houston Co., Ltd. 1, 5
Brook Motors, Ltd. 6
Brush Elec. Engrg. Co., Ltd. ... 29
Bulpitt & Sons, Ltd. 32
Burco, Ltd. 53

Cable Makers Association ... 67
Chamberlain & Hookham, Ltd.... 59
Copper Development Association 21
Cressall Mfg. Co., Ltd. 4
Crompton Parkinson, Ltd. 2, 27, 57
Crypton Equipment, Ltd. ... 17

Dapag (1943), Ltd. 62
Dorman & Smith, Ltd. 8
Dubilier Condenser Co. (1925), Ltd. 25
Duratube & Wire, Ltd. 18

Eagle Engineering Co., Ltd. ... 8
Edwards, F. J., Ltd. 66
Edison Swan Electric Co., Ltd. ... 16
Eeto Insulations 62
Enfield Cables, Ltd. 7
English Electric Co., Ltd. ... 30

Ferguson Pailin, Ltd. 26
Ferranti, Ltd. 24
Fluxite, Ltd. 58

General Electric Co., Ltd. 20, 34
Green, E., & Son, Ltd. 28
Grubb Engineering Co., Ltd. ... 62

Hardy & Padmore, Ltd. 50
Henley's W.T., Telegraph Works Co., Ltd. 35
Heatrae, Ltd. 66
Higgs Motors, Ltd. 10
Horstmann Gear Co., Ltd. ... 48
Howells (Electric Motors), Ltd.... 52

Igranic Electric Co., Ltd. ... 56
International Combustion, Ltd.... 15

Johnson & Phillips, Ltd.... ... 9
Jones, Samuel, & Co., Ltd. ... 66

Kaye, E. & E., Ltd. 4
Knightshades, Ltd. 46

Londex, Ltd. 66
Lyons, Claude, Ltd. 14

Mather & Platt, Ltd. 18
Metro-Vickers Elec. Co., Ltd. 23, 63
Metway Elec. Industries, Ltd. ... 52
Midland Electric Mfg. Co., Ltd.... 47

Nife Batteries, Ltd. 3

Oldfield Engineering Co., Ltd. 64

Parmiter, Hope & Sugden, Ltd.... 69
Pitman, Sir Isaac, & Sons, Ltd. ... 14
Pyrotenax, Ltd. 61

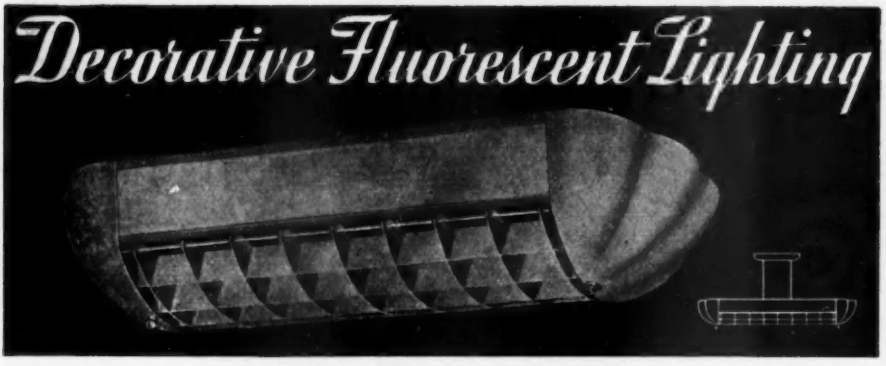
Radiovisor Parent, Ltd. ... 54
Record Electrical Co., Ltd. ... 12
Reyrolle, A., & Co., Ltd.... ... 22
Runbaken, Ltd. 66

Salem, D., Ltd. 4
Sanders, Wm., & Co. (Wednesbury), Ltd. 14
Sangamo Weston, Ltd. 36
Scholes, Geo. H., & Co., Ltd. ... 48
Senior Economisers, Ltd. ... 68
Serck Tubes, Ltd.... 60
Siemens Electric Lamps and Supplies, Ltd. 31
Simmonds & Stokes, Ltd. ... 64
Smith, Frederick, & Co.... ... 45
Steatite & Porcelain Prod., Ltd. 54

T.M.C.—Harwell (Sales), Ltd. ... 51
Tudor Accumulator Co., Ltd. ... 13

Westinghouse B. & S. Co., Ltd. 49
Wootton & Co., Ltd. 60

Yarrow & Co., Ltd. 56



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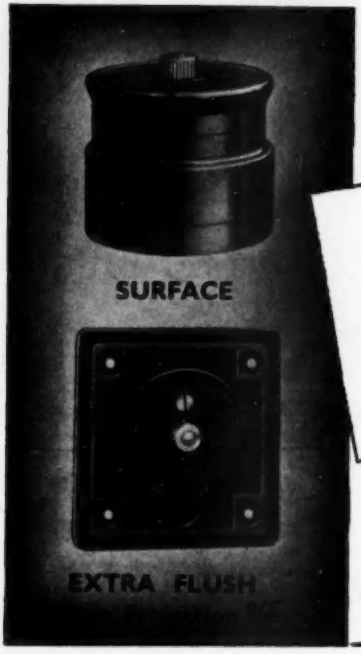

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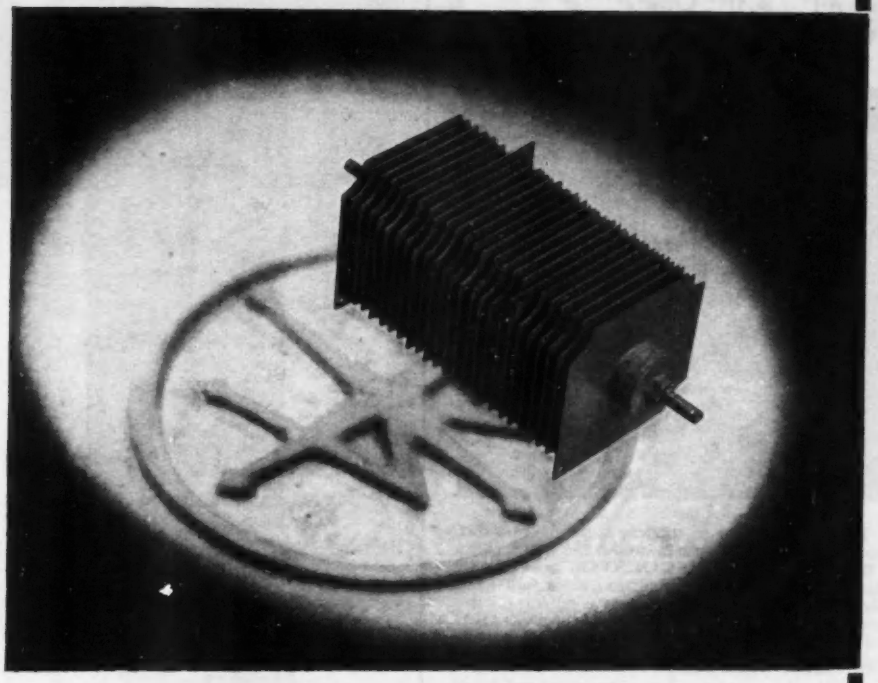

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have behind them the accumulated design and manufacturing experience of over 25 years development and production of metal rectifiers. Many copper-oxide equipments installed 21 years ago are still in operation; while Westalite rectifiers, which were first installed 10 years ago, are still in service.

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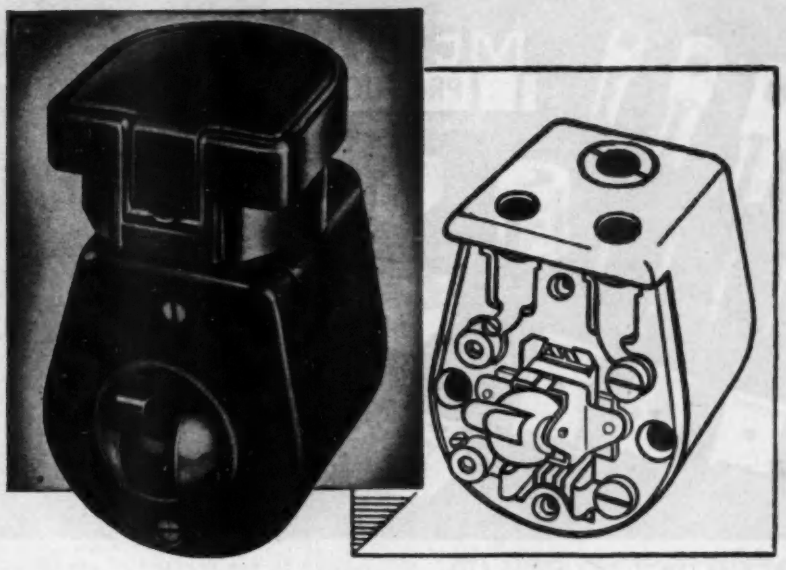

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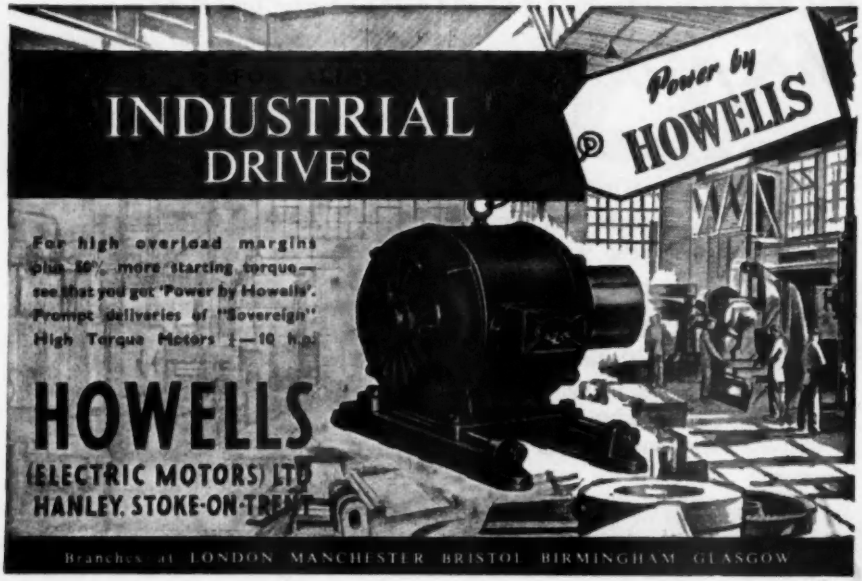
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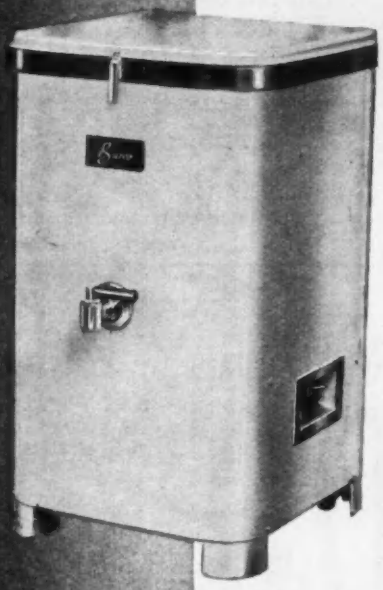
ELECTRIC WASHBOILER

CAT. NO.
E840



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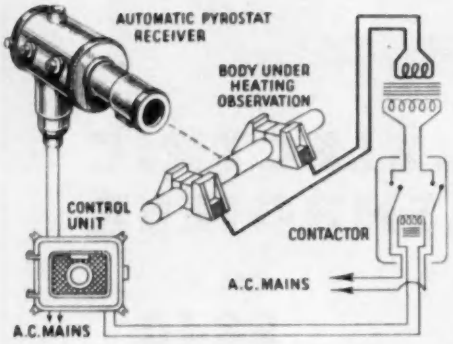

The difficulty of controlling temperature when employing direct resistance or eddy current heating in butt welding, up-setting and similar operations is well known.

The Radiovisor Pyrostat Controller provides automatic and instantaneous control by measuring the visible light radiations emitted from the heated body. Radiations from the work piece fall on to a photo-electric cell which converts light intensity into electrical energy, and at the desired temperature the heating current to the body is automatically switched off.

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S.P.51

These 12 features explain why the **FALCO Cooker** *is such a favourite . . .*

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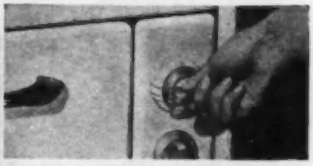

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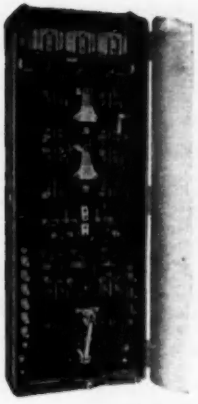

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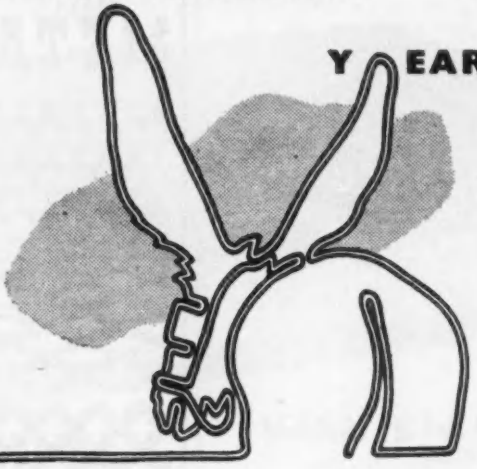

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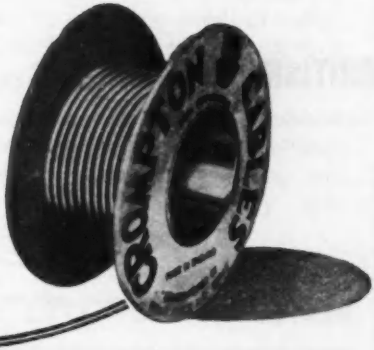

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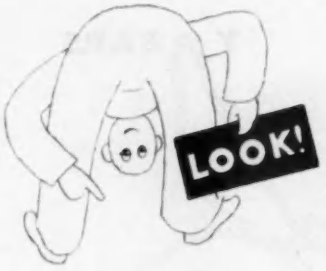

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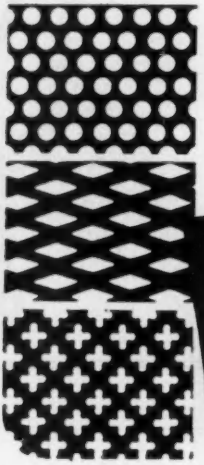

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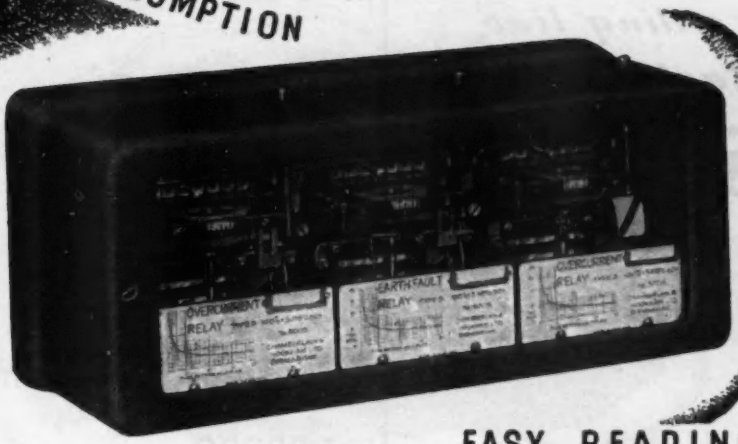

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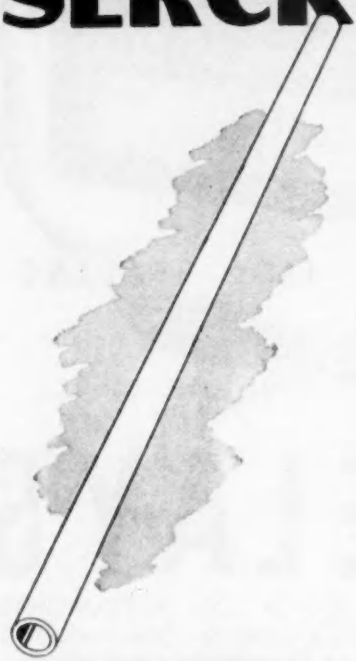

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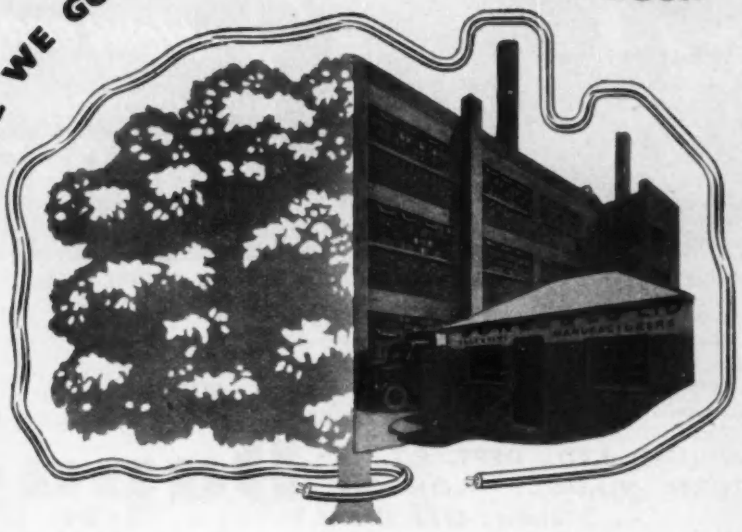

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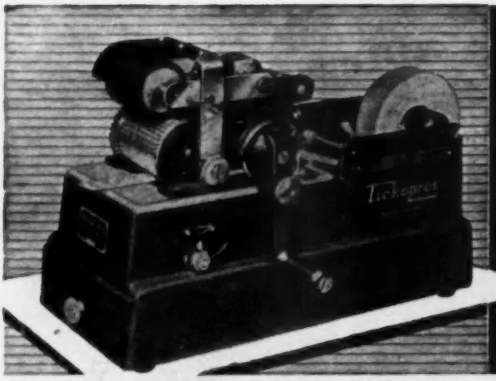

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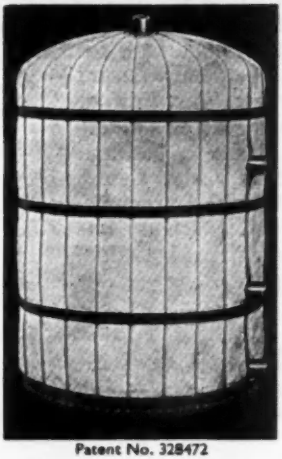

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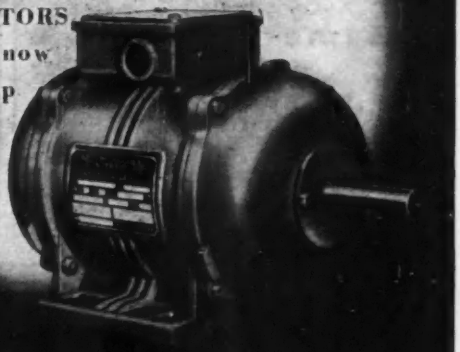

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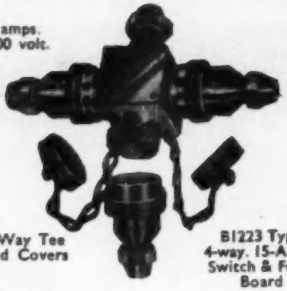

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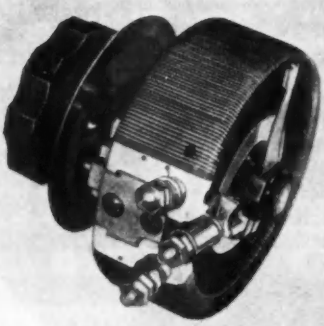

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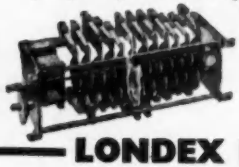

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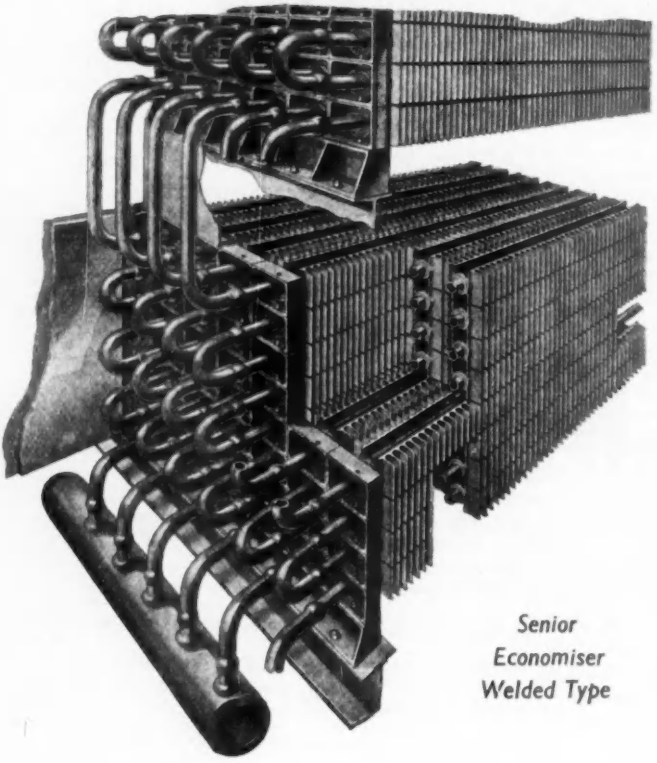

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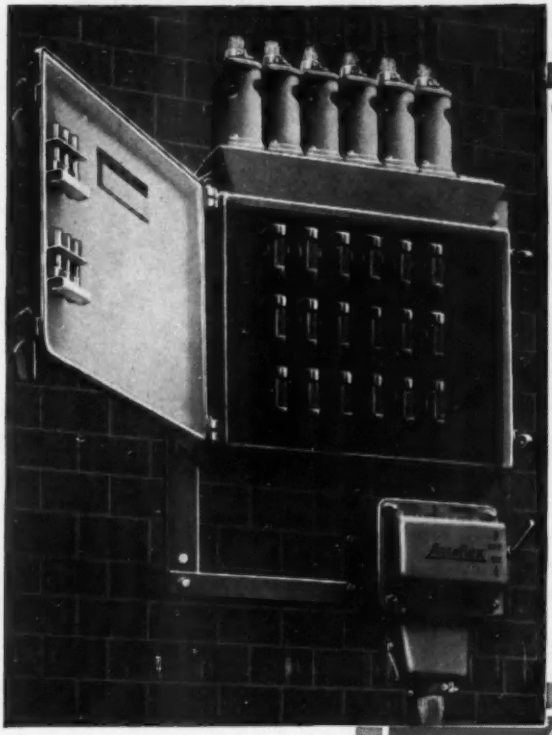

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List Section No. 28A fully describes these distribution boards.

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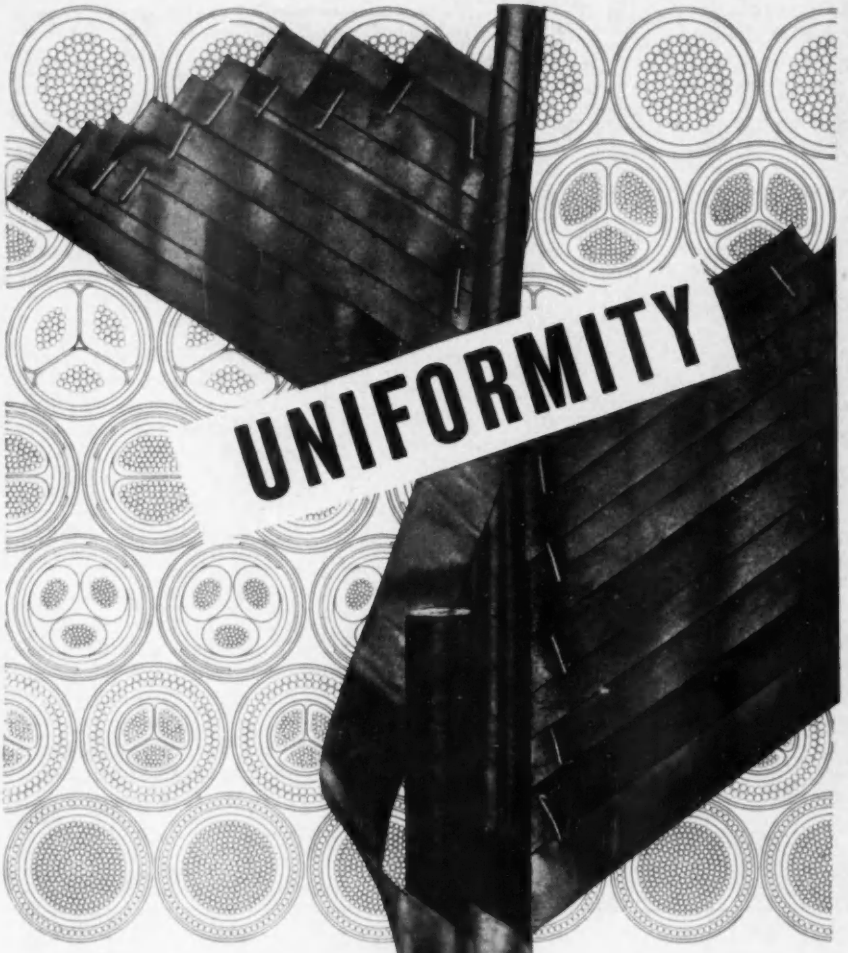

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